

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

-----	x	
	:	
HOWARD HESS DENTAL LABORATORIES	:	
INCORPORATED and PHILIP GUTTIEREZ d/b/a	:	
DENTURES PLUS, on behalf of themselves and all others	:	
similarly situated,	:	
	:	
Plaintiffs,	:	C.A. No. 99-255 (SLR)
	:	
-against-	:	
	:	
DENTSPLY INTERNATIONAL, INC.,	:	
	:	
Defendant.	:	
-----	x	

**APPENDIX TO PLAINTIFFS' BRIEF IN SUPPORT OF THEIR MOTION TO
SUPPLEMENT THE RECORD, AND REQUESTING THAT THE COURT'S PRIOR
ORDER BE AMENDED TO REFLECT SUCH SUPPLEMENTATION**

Pamela S. Tikellis (No. 2172)
Robert J. Kriner, Jr. (No. 2546)
Scott M. Tucker (No. 4925)
CHIMICLES & TIKELLIS LLP
One Rodney Square
P.O. Box 1035
Wilmington Delaware 19801
(302) 656-2500

Thomas A. Dubbs
Richard T. Joffe
LABATON SUCHAROW LLP
140 Broadway
New York, New York 10005
(212) 907-0700

October 30, 2007

TABLE OF CONTENTS

Expert Report of Dr. Raymond S. Hartman, dated February 29, 2000.....	A-1
Expert Report of Dr. David Reitman, dated February 29, 2000	A-107

EXPERT REPORT

Raymond S. Hartman

I. Qualifications

1. My name is Raymond S. Hartman. I am Director of Greylock McKinnon Associates (GMA), Special Consultant to Lexecon Inc. and Consultant to Charles River Associates, Inc. (CRA), all of which are consulting and litigation support firms located in Cambridge or Boston, Massachusetts.

2. I am an economist specializing in microeconomics, econometrics and the study of industrial organization. Microeconomics is the science used to analyze and characterize the behavior of groups of consumers and producers that constitute markets. Econometrics is a science that makes use of mathematics and statistics to measure and quantify economic behavior and economic phenomenon in markets. The study of industrial organization makes use of both microeconomic theory and econometrics. It focuses upon the structure, conduct and performance of the participants (consumers and producing firms) in markets and industries, for the purposes of predicting behavior and addressing such policy issues as antitrust, regulation and industrial policy.

3. I have taught economics, conducted economic research and provided economic consulting in my areas of specialization for thirty years. I taught economics as an Assistant Professor and Associate Professor within the Department of Economics at

Boston University over the period 1977-1988. I taught economics as a Visiting Associate Professor and member of the Visiting Faculty at the School of Law, Boalt Hall, University of California at Berkeley over the period 1988-1993. I was a member of the research faculty at MIT over the period 1977-1982, during which time I conducted research in energy markets for the United States Department of Energy. During the same time, I declined the offer of a Visiting Assistant Professorship within the Department of Applied Economics at MIT, and instead lectured on a selective basis. Over the entire period since 1971, I have consulted to federal and state governmental bodies, private corporations, law firms, consulting companies, research organizations and international lending organizations. I have been and continue to be a research referee for a variety of academic journals. I am the author of more than 100 refereed journal articles, book chapters and research/consulting reports.

4. I have submitted oral and written testimony before courts of law and regulatory commissions. My testimony as an expert witness has addressed anticompetitive behavior, merger efficiencies, breach of contract, employment discrimination, patent infringement, class certification and the estimation of damages in a variety of markets and industries including, but not limited to, the electric power industry, the copper industry, the defense industry, the cable TV industry, the computer industry, the tobacco industry and the construction industry. I have participated in litigation-related analyses for an even broader set of industries, including a variety of pharmaceutical and medical device industries.

5. I received a bachelors degree in economics (magna cum laude) from Princeton University in 1969. I received a masters degree in economics from MIT in 1971 and a Ph.D. in economics from MIT in 1977. My Curriculum Vita is attached to provide specific and recent biographical and professional information (see Attachment A.1). Attachment A.2 identifies my recent testimony at deposition and trial.

My rate of compensation in this matter is \$400.00 per hour.

II. Purpose, Overview and Summary of My Analysis

6. I have been retained by counsel to the Class represented by Howard Hess Dental Laboratories Incorporated and Philip Gutierrez d/b/a Dentures Plus in the matter against Dentsply International Incorporated.¹ I have been asked to review and analyze the allegations in the matter, to assess the validity of the liability claims and to measure any damages to the Class of dental laboratories represented by Hess and Gutierrez.

7. Dentsply is alleged to have violated the antitrust laws by denying competing manufacturers' access to distributors (known as "dealers"), thereby maintaining its monopoly position and monopoly power in the relevant markets. It is alleged "dealers are a valuable and necessary means of effective distribution of artificial teeth in the

¹ The allegations in this matter are summarized in *Howard Hess Dental Laboratories Incorporated and Philip Gutierrez d/b/a Dentures Plus, on behalf of themselves and all others similarly situated, Plaintiffs, against Dentsply International, Inc, Defendant*, in the United States District Court for the District of Delaware, Civil Action No. 99-255, April 21, 1999 ("Hess Complaint"); and in *United States of America, Plaintiff, v. Dentsply International Inc., Defendant*,

United States. Specifically, Dentsply has: (1) entered into agreements and taken other actions to induce dealers not to carry certain competing lines of teeth; and (2) explicitly agreed with some dealers that the dealers will not carry certain competing lines of teeth. Among other things, Dentsply has threatened to refuse to sell teeth and other merchandise to dealers if they add certain lines of competing teeth, and on the rare occasions when a dealer has dared to offer the lines in question, has carried out its threat and terminated the dealer.”²

8. Dentsply is alleged by the Department of Justice (DOJ) to have initiated its illegal anticompetitive behavior in 1987, “when two competitors whose products compete[d] closely with Dentsply’s premium artificial teeth in quality and price [attempted to enter and] were attempting to build a dealer network.”³ As a result of their alleged conduct, Dentsply foreclosed rival manufacturers from access to the existing distribution network and impaired their ability to develop and maintain an alternative distribution network. As a result, “80% of the dealer outlets in the US that carry artificial teeth do not carry brands that compete closely with Dentsply’s premium products.”⁴ Competitive entry by rivals therefore was reduced; rivals’ costs therefore were raised; competitive options therefore were limited; and purchasers of artificial teeth therefore were harmed by paying supra-competitive prices.

in the United States District Court for the District of Delaware, Civil Action No. 99-005 (“DOJ Complaint”).

² Hess Complaint, p. 1; DOJ Complaint, introduction, p. 1.

³ Hess Complaint, pp. 3-4 and 9, see also DOJ Complaint introduction, p. 2.

⁴ Hess Complaint, pp. 9-11, se also DOJ Complaint introduction, pp. 1-2.

9. As a matter of economic theory, the damages to dental labs from this alleged foreclosure include the following. The prices paid by dental labs for all artificial teeth were higher than they would have been absent the foreclosure. The quality of the artificial teeth purchased by dental labs was less than it would have been absent the foreclosure. Finally, certain purchasers were foreclosed from the market entirely and were unable to purchase the artificial teeth they would have demanded at a lower price. These purchasers would have been able to purchase artificial teeth absent the foreclosure.

10. I summarize the results of my analysis and my conclusions as follows:

- a) Trubyte has accounted for approximately 70-80% of all artificial teeth sold in the US over most of the period 1987-1999. Its dominance as measured by market share increased from 62% in 1987 to 80% over the 1990s; this represents an increase of 29% in its market share overall. At the same time, its market share of premium artificial teeth grew from 75% in 1987 to 89% in 1992, an increase of 19%. Dentsply's share of economy and porcelain teeth also increased dramatically from 1987 to 1992.
- b) I estimate Trubyte's dominance over artificial teeth sold through distribution to be approximately 90%; that is, Trubyte accounts for approximately 90% of all teeth sold through dealer distributors.

- c) Dentsply did indeed foreclose rivals' entry and raise rivals' costs since 1987, thereby monopolizing the market for artificial teeth.
- d) While I focus upon foreclosure and damages since 1987, I have found no evidence demonstrating that Dentsply did not use its market power prior to 1987 to foreclose rivals' entry and raise rivals' costs.
- e) I have performed an analysis of Dentsply's foreclosure of the US distribution network and I find that a conservative measure of the relevant foreclosure rate is 77%. I believe that the foreclosure rate may be as high as 81%.
- f) Since 1987, the Class of all dental laboratories represented by Hess and Gutierrez paid more for all artificial teeth than they would have paid absent the illegal foreclosure.
- g) I estimate the size of the overcharge on Trubyte teeth induced by the anticompetitive conduct to range from 34% to 53% on a per-unit basis; specifically, prices would have been 34% to 53% lower absent the foreclosure.
- h) As I clarify more fully in ¶ 43, aggregate damages to the Class of dental laboratories over the period since 1987 were between \$225 million and \$351 million.

- i) This damage estimate is conservative. It includes no valuation of the reduction in product quality induced by the foreclosure. It includes no valuation of the restriction of the number of purchasers served. Because the calculation measures the overcharge on Trubyte teeth alone, it includes no valuation of the increases in the prices of competitive teeth induced by the anticompetitive conduct. Finally, it includes no valuation of overcharges occurring prior to 1987.

III. Analysis of the Relevant Markets for Artificial Teeth

11. The products relevant to this inquiry are artificial teeth sold in the United States to dental laboratories. Dental laboratories purchase artificial teeth as an input to the fabrication of removable prosthodontic dentures.

Artificial teeth are heterogeneous products differentiated in price and a variety of performance attributes, including but not limited to esthetics, translucency, wear resistance, shape, shade, type of mould (e.g., American or European), consistency of appearance, and ease of “set up”. The price/performance continuum of artificial teeth is commonly segmented by manufacturers into distinct product groups, including “premium,” “medium,” “economy” and porcelain teeth.⁵

⁵ See Trubyte Teeth Price List, January 6, 1997 (DPLY-A 025775-787) and Ivoclar “Competition Overview”(IVOC-00103X). An additional product grouping is “sub-economy”. The importance of these product attributes is described by a variety of witnesses; for example, see Brennan deposition transcript, August, 20, 1996 at pp. 42-45.

These segments or product groups are described as distinct product markets by knowledgeable persons in the industry. For example, John Miles, President and CEO of Dentsply states in his deposition, “there is a premium tooth market and an economy tooth market.”⁶ Even if these statements were to be disregarded, it is certainly true that artificial teeth as a whole is a product market.⁷

Attachment B summarizes the major manufacturers of artificial teeth sold in the United States over the last fifteen years. Attachment B identifies the artificial tooth products of these manufacturers by the distinct product groups; it also describes and compares some prices and some of the performance attributes of the alternative products.

12. The manufacturers of artificial teeth often manufacture other consumables, products and equipment sold to dental laboratories and to dentists. For example,

⁶ John Miles, Deposition transcript, March 12, 1997, p. 41, lines 21-22. He goes on to say in answer to the questions “What’s your impression that if one of the manufacturers of premium teeth were to offer a significant price break vis-à-vis its competitors? Would it be a significant variant in the laboratory’s decision making? A: Well, it would surely be a factor that would be considered. I have to say that I think the attributes of the teeth in this segment is probably more important than price. I mean if the price was significantly lower, I guess you would probably get some business, but I don’t think you would switch the market (p. 42).” He states further (p. 44), “I think that the majority of decisions in this portion of the market is not made on price. It’s made on esthetics and physical characteristics.”

⁷ Given the fact that knowledgeable market participants recognize the premium and economy artificial tooth markets and the market for all artificial teeth, I will refer to each as markets throughout my analysis.

Dentsply is composed of the following operating divisions that manufacture and sell the following products and equipment:⁸

<u>Dentsply Division</u>	<u>Products and Equipment Sold</u>
Trubyte	Removable prosthodontics and denture products: artificial teeth and related merchandise
Cavitron/Ash-Preventive Care	Dental office equipment for cleaning, polishing, irrigating teeth, infection control and preventative care products
Caulk	Dental consumable products such as impression materials, restorative materials, sealants, burs and endodontic instruments
Midwest Products Corp.	Dental handpieces and burs
Gendex	Dental and medical X-ray equipment
Rinn	Dental X-ray products
Ceramco	Crown and bridge products
New Image Industries Inc.	Intraoral dental cameras

Some of these divisions produce and sell products (laboratory products) purchased solely (or for the most part) by dental laboratories. Trubyte is such a division. Some of these divisions produce and sell products (operator products) purchased solely (or for the most part) by dentists; Ash/Preventive Care, Caulk, Midwest and Rinn are such divisions.

13. The manufacturers relevant to this matter produce and ship artificial teeth that compete in the US and internationally. However, the geographic markets relevant to this inquiry are local. Artificial teeth are purchased by dental laboratories for fabrication of dentures that are sold to local dentists serving local patient populations. These local dentists demand individualized and customized relational service stressing skilled

⁸ Dentsply International Inc., *The Procompetitive and Lawful Nature of Dentsply Trubyte Tooth Dealer Criteria and Tooth Swap Marketing Practices*, Report submitted to the United States Department of Justice Antitrust Division ("Dentsply, Report"), April 18, 1997, footnotes 1 & 2.

fabrication and rapid turnaround. The local markets for the provision of denture-related laboratory services are price and service competitive.⁹

14. In order to offer the relational services and rapid turnaround required by local dentists, dental laboratories in turn require timely and assured access to the artificial teeth and related merchandise required for denture fabrication. "In ordering from dealers, customer service and order turnaround time were perceived as the most significant factors influencing the choice of dealer."¹⁰

15. In order for the manufacturers of artificial teeth, who manufacture for national and international markets, to be competitive and successful, they must be able to effectively reach the localized markets served by dental laboratories and dentists. An effective distribution system is essential for reaching those localized markets. The distribution services required to reach and serve localized markets are distinct from product manufacture. The price and quality of distribution services can be as important for market success as the price and quality of the artificial teeth sold.¹¹

⁹ The nature of this competition is described by Turner (Deposition transcript, March 3, 1997, pp. 65-84).

¹⁰ See Dental Manufacturers of America, Inc. (DMA), *The Purchasing Habits of American Dental Laboratories*, October 1995, (DPLY 022804-922). At DPLY 022816, the timeliness required for a variety of laboratory purchases is presented.

Dentists responding to local patient populations also require timely and assured access to a variety of operatory products manufactured and sold by the suppliers in this industry through operatory dealers.

¹¹ For example, when a sample of dental labs was surveyed by the Department of Justice, the top 10 (out of 24) reasons given for "selection of a particular artificial tooth brand and line" include product and dealer attributes as follows (starting with the most important reason): 1) Fills orders promptly and accurately; 2) Offers wide variety and range of tooth shapes and/or sizes; 3) Offers teeth that are highly wear resistant; 4) Offers teeth that are highly aesthetic; 5) Offers wide variety

16. A variety of distribution methods can be used to reach the local markets served by dental laboratories. They include the following:

- a. Full service laboratory dealers – In this case, distribution services are provided by independently owned and operated dealers who specialize in the distribution of artificial teeth and a variety of other products sold by a variety of manufacturers. Some of the distribution services provided by full service dealers include the following. These dealers maintain localized inventories of artificial teeth (and other products) for easy and immediate access by and turnaround for local dental labs. These dealers usually bear the financial risk and costs of carrying those inventories. These dealers maintain sales representatives and product detailers (e.g., “tooth counters”) who promote and sell the products; who provide information about specific teeth and other products; and who develop personalized customer relationships with the dental labs. These dealers visit the lab customers and in many cases manage the labs’ product inventories. These dealers often invest in management information systems to facilitate customer billing and to manage account receivables and product returns.

and range of tooth shades; 6) Offers teeth that are highly stain resistant; 7) Has an accurate shade system/shade guide; 8) Has a local inventory of a comprehensive stock of teeth (in wide variety of shades, moulds and sizes); 9) Offers teeth that have a functional occlusal design; and 10) Handles returns and exchanges of broken sets. Source: Department of Justice (DOJ) Survey.

- b. Mail order dealers – Dealers who are **strictly** mail order dealers promote, sell and ship artificial teeth and other products from consolidated centralized locations. By centralizing and consolidating sales and promotional activities, product inventories, management information systems and “pick-pack-and-ship” activities, these dealers reduce the marginal cost of distribution. However, these dealers do not support local inventories of teeth; they do not provide the majority of relational services provided by localized full-service laboratory dealers and demanded by most of the dental labs.

- c. Hybrid dealers providing a mix of mail order distribution, telemarketing and full service distribution – Hybrid dealers combine the network efficiencies provided by the consolidated networks of the mail order dealers with the personal relational services provided by local full service dealers. Zahn, which is sometimes labeled a mail order dealer, is an example of those dealers that I categorize as hybrid, since Zahn combines the distribution technology of mail order dealers with the local presence of full service dealers.

- d. Drop shipments from manufacturers to customer laboratories – This method is used by manufacturers to complement full service distribution. Manufacturers ship product directly to specific customer labs at the direction of the local full service dealers, thereby economizing on the shipping and handling costs required to ship to the dealer and then turn around and ship to the lab. In this

case, the local dealers still manage the customer lab inventories and still provide all other relational services required by the labs.

- e. Dealer laboratories – With this type of dealer, a manufacturer attempts to bypass the existing dealer network by placing a consignment of product with and selling directly to specific laboratories that will in turn act as full service dealers. In essence, this method of distribution requires selected dental laboratories to vertically integrate backward into distribution services. This method will be competitively successful only if the specific laboratories selected as dealer labs can effectively provide both full service distribution and the services demanded of them as local dental laboratories.
- f. Direct sales by manufacturers – With this method of distribution, a manufacturer of artificial teeth produces, sells and ships product directly to the laboratory customers. None of the dealer services identified above (§ 16a) are provided.
- g. Manufacturer provision of distribution services – With this method of distribution, a manufacturer attempts to bypass the existing dealer network by providing its own distribution services. In essence, this method of distribution requires that the manufacturer vertically integrate forward into full service distribution. This method will be competitively successful only if the manufacturer can effectively provide both full service distribution and the

artificial tooth products and related merchandise demanded of them by local dental laboratories.

17. Among the methods of distribution possible in this industry, full service dealers (including hybrid dealers offering full service) have been preferred by most dental laboratories because of the services these dealers provide. As a result, full service and hybrid dealers have been and continue to be the most important method and primary channel of distribution of artificial teeth to dental laboratories in the US. This preference for full service and hybrid dealers is further enhanced when a dealer offers and provides a diverse array of laboratory products and manufacturers.¹²

18. Among the methods of distribution possible in this industry, large full service dealers, particularly those consolidated regionally or nationally as hybrid dealers with mail order and telemarketing capabilities [such as Zahn], are the most efficient technologically and the most cost effective. These dealers optimally size their distribution networks and distribution systems to exploit network efficiencies to attain scale and scope economies, i.e., to spread costs over greater levels of output and variety of products distributed.¹³

¹² “The availability of a variety of products was perceived as the most significant advantage of ordering from dealers rather than direct from manufacturers (DMA, *op. cit.*, DPLY 022808)”. The DOJ survey of dental labs (*op. cit.*) finds that an important reason for selecting a particular artificial tooth brand and line is that the dealer “Has a wide variety of manufacturers/brands of any given product.” Finally, “dealers were perceived by many lab owners as offering a price advantage versus direct ordering from manufacturers (DMA, *op. cit.*, DPLY 022814).”

¹³ The increased efficiency induced by large scale and scope networks is found generally. It is found in distribution within electric power systems; for example, see Hartman, “The Efficiency Effects of Electric Utility Mergers: Lessons from Statistical Cost Analysis,” *Energy Law Journal*, 17(2), 1996. It is found in the distribution of pharmaceutical products, hence the observed

19. Because average and variable costs of distribution decline with the scale and scope of distribution activities, all other methods of distribution in this market have been economically inferior to (i.e., more costly than) full service distribution and/or hybrid distribution by large national and regional dealers, as a matter of economic theory.

This observation is confirmed by the events observed in this market, such as the following:

- a. Incumbent manufacturers and potential entrants express a preference for the use of full service or hybrid dealers (preferably larger full service and/or hybrid dealers) to distribute artificial teeth to dental laboratories.¹⁴

consolidation of such distribution; see for examples *Federal Trade Commission (FTC), Plaintiff, v. Cardinal Health, Inc. and Bergen Brunswig Corp., Defendants & FTC, Plaintiff, v. McKesson Corp. and AmeriSource Health Corp., Defendants*, Civil Action Nos. 98-595 and 98-596, Judge Stanley Sporkin Memorandum of Opinion; and Robert Pitofsky, Chairman FTC, "Efficiencies in Defense of Mergers: 18 Months After," *George Mason Law Review*, Antitrust Symposium: The Changing Face of Efficiency, October 16, 1998. It is found in the distribution of artificial teeth and dental products; see for example, Dentsply's Chris Clark (Deposition transcript, August 21, 1996, p. 43) who indicates that the technological imperative is toward network consolidation: "the market as a whole is gravitating towards fewer localized tooth stocks."

¹⁴ Most manufacturers interviewed by the DOJ (see *Appendix*) in this matter have expressed this desire. For examples, at p. 113 of the *Appendix*, Vident states, "A manufacturer of dental products certainly wants to distribute via a national dealer;" at p. 87, Ivoclar states, "In 1987, Ivoclar decided to change its strategy and sell teeth through dealers because it is much easier to sell products locally through a dealer;" at p. 75, Austenal states, "Establishing a dealer network is crucial in order for Austenal to realize its market potential;" at p. 65, American Tooth states, "Because of the way in which distribution is done – locally to labs – dealers are integral for the sale of artificial teeth;" at p. 85-86, Heraeus Kulzer states, "Ultimately, Heraeus again decided not to enter the US tooth market, primarily because it did not anticipate that it could make inroads with the dealers." See also, V. Hale deposition transcript, January 21, 2000 at pp. 183-184; B. Bremer deposition transcript, February 9, 2000 at pp. 196-197; R. Foyle deposition transcript, January 20, 2000 at p. 52.

b. While some manufacturers at some time have been able to sell direct to some laboratories, this distribution strategy does not allow for systematic entry into the market. Given the demand for rapid turnaround, manufacturer direct sales of artificial teeth to labs must be overseen and managed at great distances and must be shipped overnight. For small orders, overnight shipment costs become prohibitive. Direct sales require that the participating dental labs manage their inventory needs, something they generally are unable to do well. When direct sales require the manufacturer to place a consignment of teeth with the labs, the manufacturer must bear the financial risks and carrying costs involved. These practices therefore raise a manufacturer's costs relative to full service or hybrid dealer distribution.¹⁵

Direct sales have had some success with larger labs that can order in larger quantities and can successfully manage their own inventories. However, the characteristics of the limited number of large lab customers that make them the likely target of direct sales distribution also make them the target of

¹⁵ For these reasons, this form of distribution has not been effective for entrants. Vident concluded after eight years of effort that direct sales were not feasible as a distribution strategy (*Appendix*, p. 119) because "(1) the labs were not skilled at keeping their inventory current, and (2) labs, waiting till the last minute, required overnight deliveries which made the teeth too costly." For these reasons, this form of distribution would not be effective for the incumbent, Dentsply. Adium, a small Dentsply dealer, believes that "Dentsply could not successfully sell its teeth direct (*Appendix*, p. 2)," and Dentsply witness Brennan (*op. cit.*, (August, 20, 1996) pp. 79-81) confirms the problems of direct sales, even to large labs (p. 81), "we do manufacturing, R&D, sales, and marketing well ... the distributor does distribution well." See also, V. Hale deposition transcript, January 21, 2000 at pp. 157-159 and 339-340; J. Miles deposition transcript, March 12, 1997 at pp. 59-60; T. Cavanagh deposition transcripts, August 22, 1996, pp. 23-24, October 13, 1999, pp. 54-57, October 14, 1999, p. 435.

manufacturer drop shipments managed by the local full service and/or hybrid dealers of that manufacturer.

- c. While some manufacturers have attempted to distribute artificial teeth via dealer labs, this distribution strategy was not well conceived.¹⁶ This distribution strategy asks dental laboratories to provide services that they are not good at providing and to sell to customers who are their natural competitors. Dental labs specialize in providing fabrication and relational services to dentists; they do not (and cannot) specialize in the broad array distribution services provided by dealers. Indeed, in many cases, labs (even sometimes large labs) are not sufficiently skilled in managing their own inventories of product. As a result, dental labs will not be able to supply distribution services as a general rule. As a result, it will be more costly consigning an inventory of teeth with a dealer lab than it will be to sell that inventory of teeth to a full service and/or hybrid dealer. Because the markets in which the dental laboratories compete are price and service competitive, any activity (such as distribution) which distracts the labs from their primary

¹⁶ Vident describes (*Appendix*, pp. 118-119) some of the difficulties inherent in a “dealer laboratory” distribution strategy. Vident concludes (p. 118), we have “rejected the notion that certain labs can function as dealers in a particular area – i.e., ‘distributing laboratories.’ This method of distributing teeth has failed because laboratories (1) do not have a sales force; (2) have no shipping department; and (3) are not employers of [the relevant] skilled salespeople.” See also Hale deposition transcript, January 20, 2000 at pp. 71-73.

It is interesting that Dentsply cites Vita when it tells the DOJ in Dentsply, *Report*, “Stocking laboratories that purchase directly from suppliers for their own account and sell out of inventory to other laboratories represent another distribution channel available to suppliers (p. 19),” while internal documents indicate that Dentsply does not believe this. Specifically, in a memo (DS 037047-051) Tom Himebaugh tells the Region IV staff “Vita has poor distribution

activities will diminish their competitiveness. Furthermore, given the rivalry found in these markets, it is unlikely that dealer labs will provide competitive distribution services to their rival labs. It is therefore not surprising that this distribution strategy has not been successful.

- d. While some manufacturers have attempted to provide distribution services themselves, such attempts have not proved successful.¹⁷ Since the technology of distribution is such that costs decline with the scale and scope of products distributed, a single manufacturer of a set of dental products and equipment simply cannot provide competitive distribution services by itself. In order to do so, that manufacturer would need to distribute the products and equipment of a variety of dental manufacturers. In other words, that manufacturer would need to vertically integrate into large-scale full-service distribution or large-scale hybrid distribution, a significant cost of entry.
- e. Distribution that is strictly mail order (i.e., without the local presence offered by hybrid distribution) offers opportunities and problems analogous to those

and depends on consignments to get teeth into the laboratory. Then the lab is supposed to sell to other labs **and that is a laugh!**" (DS 037047)

¹⁷ It appears that some manufacturers have turned, in desperation, to this strategy as a last recourse. For example, Vident (*Appendix*, p. 119) states that its "recent strategy to sell teeth is to locate small, denture-only laboratories (most denture-only labs are small) located within one hour of the home of a local Vident sales representative. ... The goal is for each sales representative to establish 4-5 customers, which he or she must call on every 2-3 weeks," thereby managing their inventory as a dealer would. See also, Hale deposition transcript, January 21, 2000 at pp.123-124.

of direct sales.¹⁸ This distribution method makes more sense for dental products and consumables sold in bulk and ordered on a weekly or monthly basis. It is less effective in providing the immediate and relational distribution services required by dental labs in their purchase of artificial teeth.

20. Systematic data summarizing distribution of competitive manufacturers in the US are unavailable for the 1987-1999 period. Distribution has changed over that period, due in great part to consolidation. Some of the data that are available are presented in Attachment C. Attachment C.1 lists Trubyte artificial tooth and/or merchandise dealers in 1995. These dealers include the most important full-service dental laboratory dealers in the US in 1995. Most of these dealers were Trubyte dealers over much of the 1987-1999 period. The lab dealers in Attachment C.1 distributed approximately 90% of all artificial teeth sold in the US over most of the period 1987-1999.¹⁹ Included in Attachment C.1 are the most important hybrid dealers (mail order with local full-service presence). Some of the dealers in Attachment C.1 distributed other products as well, including operatory products. Indeed, some of the dealers included are operatory dealers that distributed Trubyte non-tooth merchandise. Where possible, the Attachment identifies those dealers with significant mail order activities. Where possible, the Attachment identifies the tooth manufacturers (and their products) that were distributed by these dealers.

¹⁸ At page 114 of the *Appendix*, Vident describes the difficulties of using mail order distribution.

¹⁹ I discuss this calculation in ¶ 22 below.

Attachment C.2 identifies dealers proposed by Dentsply to have been options available for competitive entry by rival tooth manufacturers. Attachment C.2a identifies Dentsply operatorial dealers and Trubyte non-tooth merchandise dealers in 1995 that were included in Attachment C.1. Attachment C.2b identifies non-Trubyte laboratory dealers at approximately the same time.²⁰ Not included in Attachment C.2 are all other operatorial dealers.

While the dealers listed in Attachment C.2 are argued by Dentsply to be viable distribution options for competitive entry, many are not. Some of the non-Trubyte lab dealers proposed in Attachment C.2b do not want to carry teeth, as discussed below (see ¶ 33 below and Attachment C.3). The operatorial dealers listed in Attachment C.2a are not viable distribution options for competitive entry. These operatorial dealers (and those that are not listed in Attachments C.1 or C.2) did not and do not distribute to dental laboratories, as a general rule. They distribute dental products directly to dentists. As a general rule, these dealers are perceived as being unable to adequately distribute to dental laboratories;²¹ many of these dealers express considerable reluctance or outright refusal to distribute to dental laboratories.²² Even some Trubyte merchandise dealers that do

²⁰ See the supporting exhibits to Dentsply, *Report*.

²¹ For example, Dentsply witness Pohl (national sales manager for Trubyte, 1992-1994) confirms this as follows (deposition transcript, October, 17, 1996, p. 48): "Q: Was it your impression that operatorial dealers tended to focus their salespeople on dentists versus laboratories? A: Yes. Q: Is it a different area of expertise at all, calling on laboratories versus calling on dentists? A: Yes, it is."

²² For one example, Island Dental Supply (*Appendix*, p. 29) states, "Island Dental will never sell teeth again for two reasons: (1) it has no interest in selling to laboratories because they are notorious for not paying their bills (it now sells strictly to dentists, which have more credibility), and (2) there is a tremendous amount of 'maintenance' involved in stocking and distributing teeth." See also, S. Shernowitz deposition transcript, November 15, 1999, pp. 135-140 and 170-172. For a second example (*Appendix*, p. 48), Sullivan Dental decided in the mid-1980s "not to

distribute to dental laboratories express considerable reluctance or outright refusal to sell artificial teeth to the dental laboratories.²³

Attachment C.3 identifies those dealers in Attachment C.2 that, contrary to Dentsply claims, were not realistically available for the distribution of competitive manufacturers' artificial teeth. The Attachment indicates why they were not available.

IV. Analysis of Dentsply's Monopoly Position and Anticompetitive Behavior

21. Over the past twenty years, Dentsply through its Trubyte Division has been the dominant supplier of artificial teeth in the United States. While comprehensive annual sales data for artificial teeth sold in the US are generally unavailable for the period as a whole, the data that do exist indicate that Trubyte's dominance has been substantial. Attachment D summarizes the data. In Attachment D.1, market shares for porcelain, premium, medium, economy and all artificial teeth are presented. Trubyte has accounted for approximately 70-80% of all artificial teeth sold in the US over the period. Its dominance increased from a market share of 62% in 1987 to 80% over the 1990s; this represents an increase of 29% in its market share overall. At the same time, its market

enter the artificial tooth distribution business ... [and] ... the dental lab merchandise business .. " Attachment C.3 provides other examples. See also, K. Ackeret deposition transcript, October 27, 1999 at pp. 16-22 and 50-57.

Dentsply recognizes this reality: "Many full service [operator] dealers have low interest in labs, i.e., Patterson" (Project Max/Black Jack, DPLY-A 061555).

As discussed below in the text, Dentsply incorrectly argues that these dealers offer competitive entry options. For example, Island Dental Supply and Sullivan Dental are prominently mentioned by Dentsply (*Report*, p. 28) as distribution options for rival tooth manufacturers.

share of premium artificial teeth grew from 75% in 1987 to 89% in 1992, an increase of 19%. Dentsply's share of economy and porcelain teeth also increased dramatically from 1987 to 1992. Over this period, competitors to Dentsply/Trubyte in the US (and worldwide) include Ivoclar and Vita who compete primarily in the premium tooth market. Other manufacturers selling in the US include Austenal/Myerson & Kenson, Universal and American Tooth.²⁴ All competitors to Dentsply have relatively small market shares of the US for all teeth and for the various qualities of teeth.

In 1992, the HHI for all artificial teeth was 6465. The HHI for premium teeth was 7954 and the HHI for porcelain teeth was 8314. The HHIs for medium and economy teeth were less but were still substantial. All of these HHIs are more than substantial.²⁵

Attachment D.2 summarizes the sales data that are available. US sales of all artificial teeth to labs were approximately \$64.2 million in 1987 and grew to be \$68.8

²³ See ¶ 33 below.

²⁴ Completing the market are a number of manufacturers with very small market shares and some private label artificial teeth.

²⁵ The HHI (Herfindahl-Hirschman Index) is a standard economic measure of market concentration. It is defined as the sum of the square of the market shares of all market participants (i.e., $HHI = (S_1^2 + S_2^2 + \dots + S_n^2)$, where n is the number of competitors in the market and S_i is the market share of competitor i). For the most concentrated market possible, a monopoly, $S_i = 100\%$ and $HHI = 10,000$. For a more competitive market, say one that is characterized by 10 equal sized competitors, $S_i = 10\%$ and $HHI = 1,000$. As the HHI rises from below 1000 toward 10,000 (monopoly), the market power of the competitors increases as does their ability to raise price above cost.

It is worth noting that the DOJ, in their Horizontal Merger Guidelines (Issued 4/2/92, revised 4/8/97), characterizes markets in which the HHI is greater than 1800 as "highly concentrated." Mergers of any consequence in such markets are viewed as presumptively anticompetitive. The HHIs in the markets for artificial teeth clearly are well above the threshold for a "highly concentrated" market. Indeed, the HHIs in the markets for artificial teeth are higher than those found in many, if not most, US markets.

million in 1999. Sales of premium artificial teeth to labs were \$11.2 million in 1987 and \$44.9 million in 1999 (see Attachment D.3). Attachment D.3 calculates US sales of the four categories of teeth by the major competitors in the markets.

22. In the US, Dentsply distributes all of its artificial teeth through dealers. Indeed, Dentsply distributes most of its US product lines through dealers.²⁶ Because most other manufacturers use dealer distribution for only part of their artificial tooth sales, Trubyte's dominance over the dollar volume of artificial teeth sold in distribution through dealers is even greater than it is in manufacture. I estimate their dominance over artificial teeth sold through distribution to be approximately 90%; that is, Trubyte accounts for approximately 90% of all teeth sold through dealer distributors.²⁷

Given Dentsply's implicit and explicit (as of 2/1/93²⁸) dealer criterion requiring that recognized Dentsply dealers must add incremental business, Dentsply's dealers are predominantly the larger, more successful and more efficient national and regional full service and hybrid laboratory dealers in the US. Most of the small, local single outlet dealers do not meet this criterion.

²⁶ Brennan, *op. cit.*, (August, 20, 1996) p. 79; Dentsply *Report*, pp. 4-5.

²⁷ In Attachment D.1, manufacturer shares of all artificial teeth sold in 1992 are as follows: Dentsply (80%), Ivoclar (2.2%), Universal (2.0%); Myerson/Austenal/Kenson/Swissedent (3.8%), American Tooth (3.5%), Dentorium (1.4%), Vita/Vident (2.5%) and Other (4.7%). Dentsply sells all of its artificial teeth through dealers. Precise data measuring the mix of artificial teeth sold through dealers by the other manufacturers are not available. Given existing data, I assume that Ivoclar sells no artificial teeth through dealers and all other manufacturers sell 50% of their artificial teeth through dealers. Given these assumptions and the market shares cited above, Dentsply accounts for 90% of artificial teeth sold through dealers.

²⁸ Criterion 5 of Dentsply/York Division Dealer Criteria, Effective: February 1, 1993 (DPLY-A 109984) states that, "Companies applying for recognition as a Dentsply/York Division dealer must submit a written plan which indicates that incremental business will be gained by Dentsply."

Hence, Dentsply's dominance in the US distribution network is overwhelming.

23. On a structural basis, Dentsply has possessed and still possesses significant market power in both the manufacture and distribution of artificial teeth in the United States. This market power grew over 1987 through 1999. This market power has been further enhanced by two factors. First, Dentsply has aggressively and successfully promoted its product lines with dentists and dental schools, thereby generating brand recognition and loyalty. Second, Dentsply has an important presence in the markets for related dental laboratory products and for dental operator products. Sales of these related dental laboratory products are important to laboratory dealers. Purchases of these other dental products are important to labs and dentists. If sales of these other Dentsply products by a dealer can be linked by Dentsply in any way to that dealer's sales of artificial teeth, that linkage will give Dentsply additional power over the market for Trubyte artificial teeth. As discussed below (¶ 25), that linkage was exploited by Dentsply.

24. Dentsply is alleged by the DOJ to have begun exploiting its monopoly position in manufacture and its market power over distribution in or around 1987, when it initiated restrictive dealing arrangements. It is further alleged by the DOJ that Dentsply did not restrain independent dealers' ability to sell artificial teeth prior to 1987, and that "dealers commonly carried at least two competing lines of teeth."²⁹ The putative cause of the

²⁹ Hess Complaint ¶ 27; DOJ Complaint ¶ 17. While it is alleged that Dentsply's restraints began in 1987, I find no evidence that the restraints were not practiced prior to 1987.

initiation of the restrictive dealing arrangements was the committed entry by Vident and Ivoclar.

Dentsply explicitly formalized the restrictive dealing arrangements in February 1993 with its "Dentsply/York Division Dealer Criteria".³⁰ Criterion #6 therein states, "dealers who are recognized as authorized distributors may not add further tooth lines to their product offering." If a dealer violated Criterion #6, that dealer was subject to termination as a Dentsply artificial tooth dealer. When Dentsply terminated dealers for violating Dealer Criterion #6, they sometimes extended the termination to other Trubyte non-tooth merchandise carried by the terminated dealer.³¹ While the Criterion has allowed a dealer to continue to distribute brands of teeth carried prior to the implementation of the Dealer Criteria ("grandfathered" brands), if a dealer dropped a brand for any reason, that dealer could not bring it back if he/she so desired. Furthermore, the ability of a dealer to carry "grandfathered" brands could be lost upon acquisition by another dealer.³²

³⁰ Brennan (*op. cit.*, August, 20, 1996.), Exhibit #4, DPLY-A 109984.

³¹ When DLDS was threatened with termination, the threat included both teeth and merchandise (Brennan, October 28, 1999 deposition, pp. 192-197). When Frink was terminated, the termination included both teeth and merchandise (Brennan, October 28, 1999 deposition, p. 86).

³² In a November 5, 1998 letter (DARBY-001120 Y) to Sidney Nordhauser of Darby Dental, Christopher Clark and Steve Jensen explain Dentsply dealer criteria as follows: "A central tenet of our dealer criteria is that Trubyte tooth dealers cannot pick up another manufacturer's tooth line upon becoming a Trubyte tooth dealer. In the event of dealer mergers and acquisitions, we have consistently held that the pertinent entity with respect to this merger matter is the acquiring dealer. In this case Darby is acquiring DTS, so the tooth lines that Darby markets are the tooth lines that would be relevant after the merger. ... Under the Trubyte dealer criteria Darby is requested to discontinue the stock and sale of Vita teeth."

While both complaints in this matter identify particular examples of market foreclosure facilitated by Criterion # 6,³³ the record suggests that the actual extent of the foreclosure is considerably greater. Attachment E summarizes some of the cases of dealer anticompetitive conduct and market foreclosure found in the discovery materials, beginning in 1987. In many cases in Attachment E, the foreclosure was directed at entrants who were capable of contesting the artificial tooth market as a whole and/or the premium segment of the market in particular. In some of these cases, Dentsply allowed dealers to continue to carry brands of teeth that were viewed as uncompetitive to Dentsply.³⁴

25. The threat of a termination triggered by Criterion #6 has been compelling given the fact that Trubyte accounts for more than 9 of 10 artificial teeth sold by dealers.

Consider the following example. Assume that a dealer observes preferences in dental laboratory demand for the artificial teeth of an entrant such that the entrant would capture 10-15% of the dealer's market for artificial teeth, at the margin. If the dealer can simply add the entrant's artificial teeth to his/her other product offerings, substitution will occur at the margin; that is, the dealer will sell 15% less Trubyte teeth but will replace

³³ For example, the Hess Complaint ¶ 31 (see also DOJ Complaint ¶ 20) mentions two dealers (one being Frink) who agreed to carry Ivoclar teeth, but were later foreclosed from doing so. One was persuaded not to carry Ivoclar teeth; Frink was terminated until it agreed not to carry the Ivoclar product line. This complaint also mentions Dentsply's foreclosure of Vita products from the Tooth Counter (¶ 32).

³⁴ For example, in Exhibit 10 (Bates Nos. DPLY-A 109997-99) to the Brennan deposition (*op. cit.*, August, 20, 1996), Clark indicates that Dentsply sought to recognize Darby as a Dentsply/Trubyte dealer in 1994 if, among other things, Darby "discontinue[d] sales of any tooth line within 20% of our price points (all of their lines except for subeconomy and low-end porcelains [i.e., Nordent teeth])."

those lost sales with the 15% sales increase of the entrants teeth. Dental lab purchasers will be made better off; and the dealer will prefer to offer the products of both the entrant and the incumbents. If, however, substitution to the entrant at the margin causes Dentsply to terminate sales of all Trubyte teeth to the dealer (which account for approximately 90% of a representative dealer's artificial tooth sales), then a significant amount of infra-marginal purchases (i.e., all sales other than the marginal sales, or 90% less than the 15% of sales) will be lost to the dealer in addition to the marginal sales.³⁵ If sales of Trubyte non-tooth merchandise are further lost due to the termination, the economic loss to the dealer will be compounded.

Under these conditions, it would be economically irrational for an existing laboratory dealer to agree to carry the artificial teeth of a new entrant, even if purchasers as a whole would benefit from that entry.

³⁵ This may be made clearer by example. In the *Appendix*, a variety of lab dealers make explicit the financial implications of termination. For example (see pp. 6-8), over 1992-1993, Atlanta Dental Supply (ADS) conducted a survey indicating that addition of the Vita tooth line would benefit customers and add incremental sales volume. ADS therefore came to a tentative agreement with Vident to add the Vita line to its then current product offerings (90% Dentsply, 3% Myerson, 3% American Tooth and 3% Lactona). The initial inventory commitment would have amounted to \$15,000, which "would not have affected the other [4] lines carried by Atlanta." Dentsply threatened termination, and ADS complied since "losing the Dentsply line would have had significant repercussions for ADS because Dentsply comprises 90% of Atlanta's tooth stock".

For a second example (pp. 24-26), when Frink was terminated as a Dentsply dealer and could no longer access Dentsply teeth and merchandise from other Dentsply dealers, Frink dropped Ivoclar and re-established "itself as a Dentsply dealer", "because Dentsply was a larger line and provided more business." Frink concluded it "would be better off reaping \$300,000+ in Dentsply retail sales, than in attempting to establish the Ivoclar line. Cavanagh [former Frink President] felt he could build up Ivoclar sales equivalent to his Dentsply sales, but doing so might take 3-4 years." See also T. Cavanagh deposition transcript, August 22, 1996, pp. 28-40, October 13, 1999, pp. 72-73 and October 14, 1999 pp. 337-338, 357-359 and 370-374; P. Segnere deposition transcript, January 27, 2000, pp. 210-213; K. Kashfian deposition transcript, August 5, 1996, pp. 22-27.

26. The economic damages stemming from sales lost due to termination frequently have been exacerbated by Dentsply's dealer practices. Once a dealer has been terminated, that dealer is left with an inventory of teeth,³⁶ some of which have become economically obsolete or have at least diminished in value. Had the dealer not been terminated, these teeth would be returned to Dentsply for credit toward more popular product offerings. The option to make such returns is lost on termination. The dealer must often sell these teeth at distress-sale price levels, thereby incurring a capital loss on that tooth stock. Likewise, many credits earned by the dealer over time for tooth returns, discounts and meeting sales goals are paid intermittently and credited toward future tooth purchases. Many of those credits are lost with termination.

27. The cumulative effect of these costs is substantial. As a result, violation of Criterion # 6 has been infrequent. Frink was terminated for violation of Criterion #6 in

³⁶ In discussing "the 'lock in' effect of exchange account policies" (Exhibit 7, Brennan, *op. cit.*, (August, 20, 1996) DPLY-A 110013), Brennan (p. 181) responds to questions as follows: "Q: And accordingly a dealer that somebody wanted to go exclusive to another manufacturer, the lock in effect would be in a Dentsply manufacturer maybe a significant barrier to their switching? ... A: It might be. ... Q: But if they could return it [consignment inventory] then this lock in disappears? A: Correct." Furthermore, at (p. 188): "Q: What's the effect of terminating a dealer on the dealer? They have to return their stock to you? Can they return their stock to you? A: Again I think that in the past there may have been instances where they were not allowed to return teeth."

For a second example, consider the May 29, 1990 letter to Robert Rath from Gordon Hagler, Director, Sales and Marketing for Dentsply. This letter terminates Dental Technician's Supply as an authorized Dentsply distributor of teeth stating, "Effective upon receipt of this letter, Dentsply will no longer accept any tooth returns from any DTS branch." (DETS 000002)

1987; Trinity was terminated in 1993.³⁷ This observed reluctance by dealers to violate Criterion # 6 is economically rational.

28. The market foreclosures discussed above were directed at existing dealers. Dentsply is alleged to have further foreclosed Vita and Ivoclar from the market by strategically and preemptively foreclosing entry via newly available dealers. Dentsply did so by recruiting newly available dealers on the condition that they not sell Vita and Ivoclar teeth. Other evidence supports these allegations.³⁸

29. A direct cumulative effect of Dentsply's anticompetitive tactics has been to raise the costs of its rivals in the relevant product and geographic markets. Vita and Ivoclar were foreclosed from the most efficient, cost-effective methods of distribution – the larger national and/or regional full service and hybrid dealers. American Tooth, Austenal and Universal were similarly foreclosed.³⁹ The only options available to these

³⁷ See Brennan (*op. cit.*, August, 20, 1996), Exhibit 6 and Attachment E to my report for other examples.

³⁸ For examples, Exhibit 10 (Bates Nos. DPLY-A 109997-99) to the Brennan deposition (*op. cit.*, August, 20, 1996) summarizes Dentsply strategy toward several dealers. With regard to Lincoln, Fred Robinson had been told that Lincoln would not be authorized by Dentsply ("he would not receive the line"). However, "Vita [was later] making arrangements to open Lincoln." Dentsply then concluded they would "open-up Lincoln (on condition they do not also bring in Vita)." With regard to Darby, Dentsply knew that Darby was "making arrangements to bring in Vita by end of year". Dentsply recommended that Darby be recognized if "a) they do not pick up Vita: b) they must discontinue sales of any tooth line within 20% of our price points". If they did not, Dentsply would "threaten to cut-off Kent". In both cases, the Vita line was not picked up.

With regard to DTS, T. Thelin states in a September 21, 1994 memo to C. Clark "The significant reason for giving DTS our tooth stock line is that we would eliminate Vita and Ivoclar competition in Kansas City and the surrounding area. ... Both Vita and Ivoclar are looking to expand. Our exclusive tooth line with DTS would prohibit this expansion." (DS 039906)

³⁹ Examples of foreclosure experienced by each manufacturer (and by Fricke and Heraeus Kulzer, Inc.) are found in the *Appendix*. Also see, P. Segner deposition transcript, January 27, 2000 at pp. 210-213; B. Bremer deposition transcript, February 9, 2000 at pp. 116-122; T.

manufacturers were economically inferior (more costly) methods of distribution such as the following: direct sales; dealer laboratories; small, local non-Dentsply dealers; forward integration by manufacturers; operator dealers; and mail order dealers (who were strictly mail order).

- a. Direct sales are not a viable means of systematic distribution.⁴⁰
- b. Dealer laboratories are not a viable means of distribution.⁴¹
- c. Non-Dentsply laboratory dealers are not large enough to offer systematic and cost-effective distribution.⁴²

Cavanagh deposition transcript, August 22, 1996, pp. 28-40, October 14, 1999, pp. 337-338 and 370-374.

⁴⁰ Most of the rival manufacturers make this claim; see the *Appendix*. See V. Hale deposition transcript, January 20, 2000, pp. 182-3. Dentsply agrees. When asked if Dentsply “would reduce the cost of distribution by going direct” Dentsply witness Brennan responded (*op. cit.*, August, 20, 1996, p.100) “Oh, no, I don’t think so.” He discusses (pp. 86-90; pp. 100-103) the logistic problems arising with selling direct, including inventory control, sales and shipping to smaller customers. He concludes that selling direct would be more expensive, particularly to the “8000” smaller labs.

In an undated memo (DS 037047-051) to the Region IV Meeting in re “Selling Weaknesses of Competitive Teeth,” Tom Himebaugh summarizes the problems of selling direct for selected competitors as follows (DS 037047): “Vita – direct .. Vita has poor distribution and depends on consignments to get teeth into the laboratory.” “Ivoclar – direct .. Most of their distribution is from depots or consigned stocks of teeth .. the service is not quick unless overnight charges are paid by the customer.” “Universal – dealer and direct .. The labs that have been buying direct are finding huge exchange account problems (DS 037048).” See also R. Foyle deposition transcript, January 20, 2000, pp. 159, 179-181.

⁴¹ See Vident’s experiences (*Appendix*, pp. 118-119). See V. Hale deposition transcript, January 20, 2000, pp. 72-3 and 182-3. Tom Himebaugh summarizes how well dealer labs work as a method of distribution: 1) “Vita has poor distribution and depends on consignments to get teeth into the laboratory. Then the lab is supposed to sell to other labs and that is a laugh! (*ibid.*, DS 037047)” 2) “Myerson – direct and dealer .. This would be our toughest competition if it had ever been marketed correctly. This one tooth example is why you cannot depend on laboratories to market your tooth line. Myerson has a very nice looking tooth line, very good wear resistance that is proven, and it is an established name in teeth, but no one has pushed them and no one knows where to get them (DS 037050).” See also R. Foyle deposition transcript, January 20, 2000, pp. 152-153 and Burkhardt deposition transcript, January 24, 2000, pp. 104-109.

- d. Operatory dealers cannot offer systematic and cost-effective distribution.⁴³
- e. Manufacturers cannot profitably integrate forward into distribution.⁴⁴
- f. Mail order dealers (strictly mail order) do not offer systematic and cost-effective distribution.⁴⁵

As rivals have been forced to turn to these inferior methods of distribution, their costs have been raised.

30. Indeed, it is probable that Dentsply's own distribution costs have been raised as a result of their efforts to foreclose competitive entry into distribution. The reason is that

⁴² The reason is that the larger dealers have already been locked in by the Dentsply dealer criteria. Dentsply's Dealer Criteria require large minimum orders for teeth and equipment (Criterion # 2) and require that the dealer generate incremental business (Criterion # 5) (see DPLY-A 109984). Those dealers authorized under these criteria have had to be relatively large; smaller dealers are economically uninteresting to Dentsply. See also R. Foyle deposition transcript, January 20, 2000, pp. 52-53 and 79-80.

Importantly, these remaining smaller dealers are economically uninteresting to other manufacturers for the same reasons. For example, Vident's dealer criteria (*Appendix*, p. 113) also identify larger dealers as desirable candidates. Of these, "(1) most dealers are operatory dealers and sell little if any products to the dental laboratory, and (2) those dealers that are viable .. already carry Dentsply teeth, and are thus precluded from carrying the Vita lines." See V. Hale deposition transcript, January 20, 2000, pp. 183-4.

⁴³ As mentioned in footnotes 21 and 22, many of the operatory dealers that Dentsply proposes as desirable avenues for entry are either unable or unwilling to distribute to labs. For example, two large operatory dealers proposed by Dentsply (Island Dental Supply and Sullivan; *Report*, p. 28) did not want to sell teeth. See also, S. Shernowitz deposition transcript, November 15, 1999, pp. 135-140 and 170-172 and K. Ackeret deposition transcript, October 27, 1999 at pp. 16-22 and 50-57. The same is true of other operatory dealers put forward by Dentsply; see Attachment C.3. Such reluctant distributors would have made poor business partners. As Vident witnesses state (*Appendix*, p. 113), "Operatory dealers are not an attractive option."

⁴⁴ See Vident's experiences (*Appendix*, pp. 119-120). See also R. Foyle deposition transcript, January 20, 2000, p. 142 and V. Hale deposition transcript, January 20, 2000, pp. 329-335.

⁴⁵ See Vident (*Appendix*, p. 114).

some of their distribution decisions have been based upon the imperatives of strategic foreclosure rather than the technological imperatives of distribution network efficiencies.⁴⁶

31. The second direct effect of Dentsply's anticompetitive tactics has been to foreclose rivals' uncommitted and committed entry into the relevant product and geographic markets. Incumbent competitors with considerable excess capacity have been unable to exploit that excess capacity and bring additional product to market.⁴⁷ Credible potential entrants, after undertaking detailed and costly analyses of the feasibility of committed entry, have decided against that entry in the face of Dentsply's anticompetitive tactics.⁴⁸

⁴⁶ At the time of their authorization, Dentsply/Trubyte dealers generally have been the larger, more efficient national and regional dealers on a stand-alone basis. However, their concatenation into a single distribution network by Dentsply/Trubyte may not be as efficient (on a unit cost basis) as recently consolidated hybrid full service/mail order/telemarketing dealers such as Zahn. As a result, Brennan (deposition transcript, *op. cit.*, August, 20, 1996, p. 212) felt that the Dentsply distribution system had become "too big" in light of market consolidations discussed by Clark (deposition transcript, *op. cit.* pp. 43-65). As a result, Dentsply was strategically reevaluating its distribution system in Project Max/Black Jack (DPLY-A 061547-584) as it faced consolidations in the industry.

⁴⁷ At the time of the CID interview, Austenal's manufacturing plant was "currently operating at far less than full capacity (*Appendix*, p. 71)," and "Universal's plant .. [was] working at 20% capacity. If Universal's sales doubled, unit prices would fall a great amount (*Appendix*, p. 103)."

⁴⁸ 3M is one such credible potential entrant (*Appendix*, pp. 122-126). Bayer/Miles (ultimately acquired by Heraeus Kulzer) was considering entry in 1993, but rejected it due to the entry barriers erected by Dentsply's exclusionary practices (HER-0008x-0012x; see also deposition of Robert Foyle, January 20, 2000, pp. 167, 177-178).

V. Analysis of Dentsply's Foreclosure of the Distribution Network for Artificial Teeth

32. In the years prior to 1987 and in 1987, Dentsply already possessed a dominant position in US artificial tooth markets and exercised dominance over the distribution network for artificial teeth in the US. Their dominance has increased substantially since 1987 (see ¶¶ 20 - 22 above). A major reason for Dentsply's increased dominance has been its foreclosure of the US laboratory dealer distribution network.

33. I have performed an analysis of Dentsply's foreclosure of the US distribution network and I find that a conservative measure of the relevant foreclosure rate is 77%. As I continue my analysis, I believe that my calculation of the foreclosure rate will rise to 81%.⁴⁹

In performing my analysis, I take the relevant distributors to be laboratory dealers carrying artificial teeth. I have excluded all operatorial dealers. Operatorial dealers are not good candidates for distribution to dental laboratories generally, and they should not be included. These dealers for the most part do not have (and do not want to invest in

⁴⁹ My analysis is found in Attachment C.4. Note that the DOJ found that "80% of the dealer outlets in the United States that carry artificial teeth do not carry brands that compete closely with Dentsply's premium products (DOJ Complaint, Introduction, pp. 1-2)." Note also that the Complaint in this matter states, "Dentsply's Trubyte Division distributes its teeth through a network of 33 dealers with over 168 outlets throughout the United States, constituting approximately 80% of the outlets in the United States distributing artificial teeth and other dental laboratory products (Hess Complaint ¶ 26)." Finally, note that Vident witnesses state, "80% or more of dental product dealers carry Dentsply products. Considering only large, national and regional dealers, that number would be 100%. All of the largest dealers of dental products in the United States carry Dentsply products (*Appendix*, p. 113)."

getting) the skills and/or experience required for selling to and supporting purchases by dental labs. Indeed, many are highly resistant to selling to labs for reasons discussed above (§ 20). This interpretation is confirmed by the fact that large Dentsply operatory dealers (Sullivan and Island Dental), who have the size and scope to distribute operatory and laboratory products and who are well acquainted with the Trubyte product lines and who are already aware of Dentsply's incentive programs, have explicitly decided not to carry Trubyte teeth or merchandise for distribution to labs.

I have also excluded Trubyte non-tooth merchandise dealers. Based upon Dentsply's own dealer experience, it is clear that non-tooth laboratory dealers are unlikely to distribute artificial teeth to dental labs. For example, Dentsply identifies Becker-Parkin and Barton-Cyker Dental as two Trubyte non-tooth merchandise laboratory dealers that were available for competitive entry.⁵⁰ However, these two dealers have chosen not to carry teeth (see Attachment C.3).

Finally, I take dealer outlets as my measure of local dealer presence. For example, all 51 Patterson outlets are counted separately.

34. I believe my foreclosure analysis is conservative for the following reasons:

- a) Given the data available, my analysis treats all dealer outlets as equal. For reasons discussed above, the Trubyte dealers and their outlets are generally

⁵⁰ Dentsply *Report*, p. 28.

the larger dealers with the larger outlets in the distribution network. They therefore account for a disproportionate share of artificial teeth distributed. While at least 77% of the outlets have been foreclosed, considerably more than 77% of artificial teeth distributed have been affected.

- b) I find that Ivoclar has been foreclosed from 100% of the large national and/or regional cost-effective full service and/or hybrid lab dealers. Vita/Vident has been foreclosed from nearly 100% of the larger national and/or regional dealers. The dealers that Vident has accessed are small and local.
- c) Because my analysis has been based upon discovery materials reviewed to date, I may supplement this foreclosure analysis with addition information.

35. Dentsply argues that its dominance in distribution and its foreclosure of the dealer network have been much lower. It claims that its network of 'authorized dental products dealers' accounted for 33 out of a total 375 (9%) dealers available nationally, and that its 208 authorized Trubyte outlets accounted for only 32% of all available outlets nationally (642).⁵¹

⁵¹ See Complaint for Declaratory and Injunctive Relief, December 10, 1998 (¶¶ 8-10). The calculations are based upon data put forward in Dentsply's *Presentation to the US Department of Justice*, November 17, 1998, and Dentsply *Report*. The *Report* does not identify the 375 dealers or the 642 outlets; it does not analyze whether they are of similar size to and/or competitive with the 33 Dentsply dealers (and 208 outlets) used in the calculation.

These claims are fatally flawed. The 33 dealers (and 208 outlets) that Dentsply enumerates that carry Trubyte products are the largest most efficient national and regional dealers in the US. These dealers have distributed approximately 90% of all artificial teeth sold in the US over the period 1987-1999 (¶ 22 above). These dealers and their sales were therefore subject to the impacts of Dealer Criterion #6 described in ¶¶ 23-27 above. It is my belief that the remaining 342 dealers (375 minus 33) with 434 outlets (642 minus 208) are, for the most part, operator dealers, non-tooth laboratory dealers or smaller single-outlet local laboratory tooth dealers. The smaller single-outlet local laboratory tooth dealers offer little in the way of incremental business (according to Dentsply's own dealer criteria) and are less cost effective. They offer little or no opportunity for systematic market entry. As described above, the operator dealers are not trained to sell to labs and have little interest in selling to labs. They offer little or no opportunity for systematic entry. Finally, combined operator/non-tooth laboratory dealers offer little or no opportunity for systematic entry.

The extent of the errors in the Dentsply analysis becomes obvious when we examine Dentsply's proposals for competitive entry into specific geographic markets. In the Exhibits to the Dentsply *Report*, Sullivan Dental, the largest Trubyte Merchandise (non-tooth) dealer listed, is identified as a means of entry into 46 of 103 (45%) particular local geographic markets.⁵² Yet as mentioned above, Sullivan Dental decided in the mid-1980s "not to enter the artificial tooth distribution business ... [and] ... the dental lab

⁵² See the Exhibit in the Dentsply *Report* titled "Geographic Coverage of Non-Trubyte Dealers Selling to Dental Labs and Trubyte Non-Tooth Dealers".

merchandise business.. (*Appendix*, p. 48). ” Other dealers put forward by Dentsply are not candidates for market entry.

Finally, Dentsply concludes⁵³ that its “conduct has not substantially foreclosed market access to its artificial teeth competitors,” and that “Dentsply’s competitors retain at least two options for distributing their artificial teeth: (1) drawing upon the sizable pool of dental dealers that do not distribute Trubyte teeth, and (2) distributing to dental laboratories directly.” As my analysis indicates, these claims are incorrect.

VI. Summary of the Impacts of Dentsply’s Anticompetitive Behavior on the Consumption and Production of Artificial Teeth

36. Purchasers of artificial teeth were harmed as a result of Dentsply’s foreclosure under the assumptions of any standard microeconomic model. Overall, the economic impacts and resulting damages of Dentsply’s anticompetitive behavior have been the following:

- a. The availability of rival artificial teeth has been restricted below what it would have been absent Dentsply’s foreclosure.
- b. The costs of manufacturing and distributing competitive rival teeth have been raised above what they would have been absent Dentsply’s foreclosure.

⁵³ Dentsply *Report*, p. 54.

- c. Indeed, it is likely that Trubyte's own costs of distribution were higher than they would have been absent Dentsply's foreclosure.
- d. The demand for Trubyte teeth has been higher and less price elastic than it would have been absent Dentsply's foreclosure.
- e. The prices of Trubyte artificial teeth have been higher than they would have been absent Dentsply's foreclosure.⁵⁴
- f. Given the fact that Dentsply is the dominant firm and price leader in this market,⁵⁵ and given the fact that competitive rivals are price followers, the prices of rival artificial teeth have been higher than they would have been absent Dentsply's foreclosure.
- g. The overall quality of the artificial teeth sold in the market was less than it would have been absent Dentsply's foreclosure.⁵⁶

⁵⁴ The impact of Dentsply's conduct on prices was explicitly recognized by Dentsply. In a January 7, 1993 memo regarding the 1993 Marketing Plan Review Meeting, C. Clark states "we examine waiting on implementing a price decrease on Bioblend/Bioform plastic until we are sure we have a clear competitive threat in this segment." (DS 036126)

⁵⁵ In his deposition (*op. cit.*, p. 39), Dentsply witness Turner states in answer to a question concerning pricing, "Typically other manufacturers follow our price increase announcements. Q: Is it your understanding that Dentsply announces its prices and then most other manufacturers follow Dentsply's lead? A: Yes, that is my understanding."

⁵⁶ For example, Turner (*ibid.*, p. 52-53) indicates that Dentsply has been able to sell an inferior tooth to lab customers at a higher price: "A: I personally consider the Ivoclar Antaris and Postaris brand to be superpremium. ... Q: Why do you not consider that [Portrait IPN] to be superpremium? ... A: It doesn't have the – quite the wear resistance that SLM Trublend has. Q: The Ivoclar tooth, is it priced comparably to the SLM? A: No, ... it's slightly less. Q: Is it priced comparably to the Portrait IPN? A: Slightly lower."

At (p. 49) he claims that Bioform and Bioblend regular plastic teeth are the lowest quality premium teeth made by Trubyte. At (p. 164), in response to the question, "How does the price of Vita's premium teeth at suggested lab price compare to the price of the Bioform IPN?" he answers "Approximately 5-10% less." In summary, at (pp. 164-165) in response to the question, "So those .. dental laboratories who used the Bioform IPN were using – for a Vita prescription were using a more expensive [Trubyte] tooth, .. that was less preferable in terms of its match to the Vita shades than would have been a Vita tooth," Turner responds "They were."

- h. Certain purchasers were foreclosed from the market entirely and were unable to purchase the artificial teeth they would have demanded had the price been lower. These purchasers would have been able to purchase artificial teeth absent the foreclosure.

37. To summarize, Dentsply's restrictive dealer arrangements had the effect of limiting the capacity and raising the costs of the competitive fringe while increasing and making less elastic the residual demand faced by Trubyte. It is likely that Dentsply's own marginal costs were higher than they would have been absent the foreclosure. Prices were thereby higher; the quantity of artificial teeth supplied was thereby lower; the quality of the products supplied was thereby diminished; Dentsply was more profitable⁵⁷ than it would have been absent the foreclosure.

VII. Analysis of Competitive Harm

38. Absent Dentsply's exclusionary dealer practices, the following events would have occurred. Dentsply's rivals' costs of distribution would have been lower. The degree of competitive entry by Dentsply's rivals would have been higher. The observed degree of market concentration (HHIs) and Dentsply's market power would have been lower. Price competition would have been more aggressive and the prices of artificial teeth would

⁵⁷ Corroborated by Dentsply document entitled "Sales/Distribution Principles of Cash Cow Business" setting out the following goals: "Block competitive distribution points. Do not allow competition to achieve toeholds in dealers. Tie-up dealers. Do not "free-up" key players." (See Hess Complaint ¶ 47; DOJ Complaint, ¶ 35).

have been lower. Dentsply's profitability on its tooth product lines would have been lower.

The extent to which prices were higher than they would have been absent the foreclosure is a measure of the competitive harm caused by Dentsply's foreclosure. In order to measure this harm, we must therefore calculate how much lower prices would have been absent the foreclosure.

39. In some situations, it is possible to perform such a calculation by observing prices prior to and/or after an alleged illegal activity and comparing the prices observed before and/or after (the "but-for" prices) with those observed during the period of the alleged activity. Since the market for artificial teeth was not competitive prior to 1987, such a calculation is impossible here.

The best approach for calculating the "but-for" prices in this matter is to analyze US markets for dental laboratory products other than artificial teeth. These markets are not alleged to be subject to the exclusionary practices.

40. To that end, I have analyzed competition within the following product groups of the Trubyte Division: Trubyte Tooth Products (Porcelain Teeth and Plastic Teeth), and Trubyte Merchandise Products (Laboratory Equipment, Crown and Bridge Materials, Acrylics/Denture Base, Other Non-specific Lab Products, VLC Triad, and Dicor). Since

most of these products are sold to dental labs for the fabrication of removable dentures and related services, they are subject to many of the same characteristics of demand.

An important difference between the two groups of products, however, is the fact that merchandise products have not been subject to Dentsply's exclusionary dealer practices. As a result, relative to the markets for artificial teeth, entry into the merchandise product lines was less constrained and competition was more aggressive. As a result, observed market concentration should be lower and the power of incumbent competitors to raise prices above cost should be more limited. This is expected as a matter of economic theory.

Given the similarities in supply and demand across these product lines, absent Dentsply's anticompetitive conduct, entry into and competition in the artificial tooth product markets would have led to competitive results similar to those observed in the merchandise product markets. That is, absent their anticompetitive conduct, Dentsply's market power to raise the prices of artificial teeth above cost would have been similar to their market power in the other product lines.

41. The power to raise price (P) above marginal cost (MC) is traditionally measured by the Lerner Index (L), where $L = (P - MC) / P$. Given Dentsply's exclusionary dealer practices, we expect that the Lerner Indices observed for artificial teeth will be higher than those observed for the other merchandise products. Absent Dentsply's exclusionary

practices, we expect that the Lerner Indices for artificial teeth would be similar to those observed for the other merchandise products.

42. A common measure of the Lerner Index is the gross profit margin, correctly measured. I have analyzed Trubyte accounting information and have estimated average Lerner Indices for the Trubyte products over 1994-1998.

These Lerner Indices indicate that artificial teeth were considerably more profitable (i.e., were a 'cash cow business') than were all other Dentsply Trubyte product lines. These Lerner Indices indicate that Trubyte's market power in artificial teeth was considerably greater than it was in its other merchandise product lines. As a result, Dentsply could more aggressively raise the prices of artificial teeth above marginal cost than it could the prices of its other merchandise product lines.

43. We can use the Lerner Indices observed for Trubyte's other merchandise product lines to predict the level to which the prices of artificial teeth would fall absent the exclusionary dealer practices.

Using those Lerner Indices, I calculate the percentage price reduction and the aggregate overcharges implied for a number of "but-for" scenarios to be the following. The implied price reduction factor ranges from 34% to 53%; the implied class-wide overcharges range from \$225 million to \$351 million. The class-wide overcharges are

calculated by multiplying total 1987-1999 sales of Trubyte artificial teeth at lab prices (\$661,427,000) by the price reduction factor.⁵⁸

⁵⁸ Total sales calculated in Attachment D.2a.

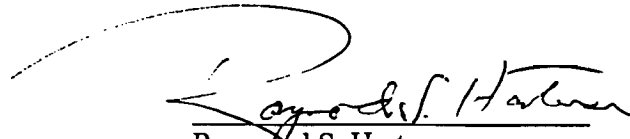
 2/28/04
Raymond S. Hartman

EXHIBIT A-1

Attachment A.1: Raymond S. Hartman Vitae

B - 58

July, 1999

Raymond S. Hartman

Date of Birth: 3/31/47

Address/Phone: 52 Greylock Road
Newton, MA 02465
617-969-6451

Cambridge Economics, Inc
4 Cambridge Center, 9th Floor
Cambridge, MA 02124
617-225-0537

DEGREES

B.A. (MAGNA CUM LAUDE) Princeton University 1969
M.S. Massachusetts Institute of Technology 1971
Ph.D. Massachusetts Institute of Technology 1977

Ph.D. DISSERTATION

An Oligopolistic Pricing Model of the U.S. Copper Industry (MIT, 1977)

HONORS, SCHOLARSHIPS, AND FELLOWSHIPS

1969-71	National Science Foundation Fellowship to MIT
1965-69	Alfred P. Sloan Scholarship to Princeton
1969	Woodrow Wilson Fellowship Honorable Mention
1965	National Merit Scholarship Finalist
1965	Voted Outstanding Chicago High School Senior

RESEARCH AND TEACHING INTERESTS

Econometrics/Statistics
The Economics of Regulated Industries
Energy and Environmental Economics
Microeconomics
Industrial Organization
Law and Economics

POSITIONS

1967-1969 Research Staff, Financial Research Center and Center for Economic Research, Princeton University
1970 Research Staff, Board of Governors, Federal Reserve Board, Washington, DC
1972-1992 Consultant and Staff Economist, Arthur D. Little, Inc.
1977-1984 Research Faculty, Massachusetts Institute of Technology
1977-1983 Assistant Professor, Department of Economics, Boston University
1983-1989 Associate Professor, Department of Economics, Boston University
1983-1988 Principal & Academic Principal, The Analysis Group
1988-1994 Visiting Associate Professor/Visiting Faculty, Boalt School of Law, University of California, Berkeley
1988-1995 Founding Principal, The Law and Economics Consulting Group
1995-1996 Vice President, Charles River Associates
1996- Senior Consultant, Charles River Associates
1996- Director, Cambridge Economics, Inc.

OTHER PROFESSIONAL ACTIVITIES

Research Referee, Bell/Rand Journal of Economics, Resources Policy, IPC Science and Technology Press, Management Science, Land Economics, Science, Energy Journal, Applied Economics, Econometrica, Review of Economics and Statistics, Journal of Business and Economic Statistics, International Economic Review, Journal of Economics and Management Strategy, Pakistan Journal of Applied Economics

PAPERS APPEARING IN OR BEING SUBMITTED FOR PUBLICATION IN REFEREED JOURNALS AND BOOKS

"Frontiers in Energy Demand Modeling," Annual Review of Energy, 4, 1979.

"The Economic Impacts of Environmental Regulations on the US Copper Industry," with K. Bozdogan and R. Nadkarni, The Bell Journal of Economics, 10(2), Autumn 1979, pp 589-618.

"Schumpeterian Waves of Innovation and Infrastructure Development in Great Britain and the United States: The Kondratieff Cycle Revisited," with D. Wheeler, Research in Economic History, 1979, Vol 4, Chapter 2.

"U. S. Demand for Copper: An Introduction to Theoretical and Econometric Analysis," with K. Bozdogan, in R. Mikesell, The World Copper Industry, Resources for the Future, 1979, Chapter 5.

"Some Evidence on Differential Inventory Behavior in Competitive and Non-Competitive Market Settings," Quarterly Review of Economics and Business, 20(2), Summer 1980, pp. 11-27.

"Short-Run Residential Demand for Fuels: A Disaggregated Approach," with A. Werth, Land Economics, 57(2), May 1981, pp. 197-212.

"An Analysis of Department of Energy Residential Appliance Efficiency Standards," The Energy Journal, 2(3), Summer

1981, pp. 49-70.

"A Note on the Use of Aggregate Data in Individual Choice Models: Discrete Consumer Choice Among Alternative Fuels for Residential Appliances," Journal of Econometrics, 18, 1982, pp. 313-335.

"A Probability Model of Oligopoly Pricing," Applied Economics, 14(3), June 1982, pp. 219-234.

"A Note on Externalities and the Placement of Property Rights: An Alternative Formulation to the Standard Pigouvian Results," The International Review of Law and Economics, 2(1), June 1982, pp. 111-118.

"A Note on the Appropriateness of Conditional Logit for the Modeling of Residential Fuel Choice," Land Economics, 58, November 1982, pp. 478-87.

"The Estimation of Short-Run Household Electricity Demand Using Pooled Aggregate Data," Journal of Business and Economic Statistics, 1(2), April 1983, pp. 127-135.

"The Importance of Technology and Fuel Choice in the Analysis of Utility-Sponsored Conservation Strategies for Residential Water Heating," The Energy Journal, 5(3), July 1984.

"Measuring the Effects of Utility-Sponsored Conservation Programs - Do the Programs Work," Energy Systems and Policy, 8(3), 1984.

"The Estimation of the Effects of Utility-Sponsored Conservation Programs," with M. Doane, Applied Economics, 18(1), 1986, pp. 1-25.

"Household Discount Rates Revisited," with M. Doane, The Energy Journal, 7(1), Winter 1986.

"Energy Conservation Programmes: The Analysis and Measurement of Their Effects," Energy Policy, October 1986.

"Product Quality and Market Efficiency: The Effect of Product Recalls on Resale Prices and Firm Valuation," The Review of Economics and Statistics, 69(2), May 1987, pp. 367-371.

"The Use of Hedonic Analysis for Certification and Damage Calculations in Class Action Complaints," with M. Doane, The Journal of Law, Economics and Organization, Fall 1987.

"Taking the Con Out of Conservation Program Evaluation" with Michael Doane, Resources and Energy, 9, 1987, pp. 187-207.

"Self-Selection Bias in the Evaluation of Voluntary Energy Conservation Programs," Review of Economics and Statistics, 70(3), August 1988.

"Household Preference for Interruptible Rate Options and the Revealed Value of Service Reliability," with M. Doane and C.K. Woo, The Energy Journal, 9, 1988.

"Households' Perceived Value of Service Reliability: An Analysis of Contingent Valuation Data," with M. Doane and C.K. Woo, The Energy Journal, 9, 1988.

"An Empirical Model of Product Design and Pricing Strategy," International Journal of Industrial Organization, 7(4), December, 1989.

"Hedonic Methods for Evaluating Product Design and Pricing Strategies," Journal of Economics and Business, 41(3), August, 1989.

"Status Quo Bias in the Measurement of Value of Service," with M. Doane and C.K. Woo, Resources and Energy, Volume 12, 1990, pp. 197-214.

"Product Emulation Strategies in the Presence of Reputation Effects and Network Externalities: Some Evidence from the Minicomputer Industry," with D. Teece, Economics of Innovation and New Technology, Volume 1, 1990, pp. 157-182; also appearing in "Symposium on Compatibility," Journal of Industrial Economics, 40(1), March, 1992.

"Consumer Rationality and the Status Quo," with M. Doane and C.K. Woo, Quarterly Journal of Economics, Volume 106, February, 1991, pp. 141-162.

"A Monte Carlo Analysis of Alternative Estimators in Models Involving Selectivity," Journal of Business and Economic Statistics, 9(1), January, 1991, pp. 41-49.

"Assessing Market Power in Regimes of Rapid Technological Change," with D. Teece, W. Mitchell and T. Jorde, Industrial and Corporate Change, 2(3), 1993, pp. 317-350.

"Estimation of Household Preferences for Long Distance Telecommunications Carrier," with Z. Naqvi, Journal of Regulatory Economics, 6(2), May, 1994, pp. 197-220.

"Strategic Rate Making in the Context of Dynamic Ramsey Pricing," with K. Jensen and K. Seiden, Applied Economics, 26, 1994, pp. 363-374.

"Incentive Regulation: Market Based Pollution Control for the Real World?" with David Wheeler, in Claudio Frischtak, ed., Regulatory Policies and Reform: A Comparative Perspective, World Bank/Oxford University Press, chapter 11, 1996.

"The Efficiency Effects of Electric Utility Mergers: Lessons from Statistical Cost Analysis," Energy Law Journal, 17(2), Fall, 1996.

"The Use of Regression Techniques in Transfer Price Analysis," with Delores Wright and J.D. Opdyke, European Taxation, International Bureau of Fiscal Documentation, TP, Suppl. No. 18, July 1996.

"The Regulatory Contract and Restructuring: A Modest Proposal," with R.D. Tabors, The Electricity Journal, 9(10), December, 1996.

"Predicting the Efficiency Effects of Mergers," Journal of Forensic Economics, 9(3), Fall, 1996.

"The Cost of Air Pollution Abatement," with David Wheeler and Manjula Singh, Applied Economics, Volume 29, 1997.

"Optimal Operating Arrangements in the Restructured World: Economic Issues", with R.D. Tabors, Energy Policy, 25(7), 1997.

"The Use of Statistical Methods in Disparate Impact Cases: The Northern Mariana Islands Case," Litigation Economics Digest, 3(1), Summer, 1998.

"The Microeconomic Analysis of Pollution, Pollution Abatement and Pollution Abatement Regulation," with D. Wheeler, forthcoming The Pacific and Asian Journal of Energy, 2000.

"Price-Performance Competition and the Merger Guidelines," forthcoming Review of Industrial Organization, 2000.

"Welfare Measures in Discrete Choice Markets," J. A. Hausman and G.K. Leonard, submitted to Journal of Law and Economics.

"How Much Should the Tobacco Companies Have Paid?", with David Cutler, Arnold Epstein, Richard Frank, Charles King, Joseph Newhouse, Elizabeth Richardson and Meredith Rosenthal, submitted to Journal of Risk and Uncertainty.

"The Economic Impact of the Tobacco Settlement," with David Cutler, Jonathan Gruber, Mary Beth Landrum, Joseph Newhouse and Meredith Rosenthal, submitted to Journal of Policy and Management.

Contributions of economic forecasting articles to the popular press, such as Management Forum and Nations Business

PAPERS IN PROGRESS

"In Defense of Accounting Information," with Richard Frank

"Analyzing Market Power in Power Markets," with Richard Tabors

"Estimating the Cost of Public Health Evils Using Observational Data", with Meredith Rosenthal, David Cutler, Richard Frank, Mary Beth Landrum, and Joseph Newhouse.

CONFERENCE PAPERS AND PRESENTATIONS

"Policies To Maximize Economic Growth In Japan," in Foreign Experience with Monetary Policies to Promote Economic and Social Priority Programs, Committee on Banking and Currency, 92nd Congress, Washington, May, 1972.

Comments on "Econometric Models of Choice and Utilization of Energy-Using Durables" by D. Brownstone, Electric Power Research Institute Workshop on the Choice and Utilization of Energy Using Durables, Boston, Nov. 1-2, 1979.

"Market Penetration of Energy Technologies," talk given in the Boston University 1980 Spring Lecture Series, "Man and Energy: Energy and Regional Growth," 1979.

"Discrete Consumer Choice Among Alternative Fuels and New Technologies for Residential Energy-Using Appliances," MIT Energy Laboratory Working Paper, #MIT-EL-79-049WP, August, 1979. Paper given at the TIMS/ORSA Meetings, "Market Penetration Assessment of New Energy Technologies," May 4-7, 1980, and at the MIT Industrial Liaison Program, "The Future Demand for Energy," March 18, 1980.

"Department of Energy Residential Appliance Efficiency Standards-An Overview," Papers and Proceedings, Second Annual North American Meeting of the International Association of Energy Economists, October 1980.

Comments on "A Review of the Conditional Demand Approach to Electricity Demand Estimation," by S. George, Electric Power Research Institute Workshop on End-Use Modeling and Conservation Analysis, Atlanta, Nov. 17-19, 1980.

"Measuring the Effects of Utility Sponsored Conservation Programs." Paper presented at the Fourth Symposium on Electric Utility Load Forecasting: Focus on the Short Run, Electric Power Research Institute Workshop, Dallas, Texas, December 1982.

"Measuring the Impact of Utility Residential Conservation Programs: Two Case Studies," with S. Braithwait and M. Doane. Paper presented in the Electric Power Research Institute National Symposium Proceedings, Annual Review of Demand and Conservation, Atlanta, May 1984, and Buildings and Their Energy Systems, St. Louis, October 1984.

"Measuring Program-Induced Energy Savings: A Comparison of Alternating Methods," with M. Doane, in Electric Power Research Institute National Symposium Proceedings, Energy Expo 1985: Meeting Energy Challenges, Peragon Press.

"Taking the Con Out of Conservation Program Evaluation." Paper presented at "Energy Conservation Program Evaluation," Argonne National Laboratory Conference, Chicago, August, 1985, and at the Eighth Annual North American Conference of the International Association of Energy Economists, MIT, Cambridge, November 1986.

"Quality and Efficiency of Limited Information Maximum Likelihood Estimators: A Monte Carlo Simulation Study," with M. Sonnenschein. Paper presented at the 27th International Meeting of the Institute of Management Sciences, Brisbane, Australia, 1986.

"Product Emulation Strategies in the Presence of Reputation Effects and Network Externalities: Some Evidence from the Minicomputer Industry," with D. Teece. Paper presented at National Bureau of Economic Research, Conference on Productivity Measurement, July, 1987, and Stanford Center for Economic Policy Research Conference on Compatibility Standards and Information Technology: Business Strategy and Public Policy Issues, February 1989.

Comments and discussion on "Efficient Postal Discounts" by John Panzar and "Efficient Component Pricing for Postal Service: It Ain't That Efficient!" by Michael Crew and Paul Kleindorfer -- both papers presented at the Session on Postal Economics, American Economic Association Meetings, Washington D.C., January 7, 1995.

"Making Electricity Markets Work: Competitive Models and Constraints to Competition," paper given at the Conference, "Keeping the Lights On: Technical and Institutional Issues in a Restructured Electricity Industry," Massachusetts Institute of Technology, Cambridge, October 19-20, 1995.

"A Discussion of Market Power in a Non-Merger Context: RTG/Power Pool Commercial Practice Issues," paper given at the Conference "Market Power: The Antitrust Dilemma for the Electric Industry," Washington DC, March 4, 1996.

Comments and discussion on "Electricity Data Needs: An Economic Perspective," by Douglas Hale, Office of Statistical Standards, Meeting of the American Statistical Association Committee on Energy Statistics, Washington, DC, Fall 1996.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT); ANALYSIS GROUP, INC., (AG); LAW AND ECONOMICS CONSULTING GROUP (LECG); AND ARTHUR D. LITTLE, INC., (ADL) REPORTS

MIT Related

MIT Energy Management and Economics Group, The Conditional/Generalized Maximum Likelihood Logit Computer Program: Instructions for Use, MIT Energy Laboratory Report, MIT-EL-78-013, June 1978.

MIT Model Assessment Group, Independent Assessment of Energy Policy Models: Two Case Studies, Report to the Electric Power Research Institute, EPRI-EA-1071, Project 1015-1, May 1979.

MIT Residential Energy Demand Group, Aggregate Pooled Data Utilized and/or Developed for Residential Energy Demand, MIT Energy Laboratory Working Paper, #MIT-EL-79-047, August 1979.

MIT Energy Laboratory, Assessment of the Appropriate Methods of Incorporating Appliance Engineering Analyses and Data into Residential End-Use Demand Models, Report to the Electric Power Research Institute, Number EA 4146,

1982.

Hartman, Suggested Procedures for the Validation of Bonneville Power Administration's Residential Energy Forecasting Model, Report to Bonneville Power Administration, June 1983.

R. Hartman and P. Spinney, Incentive Regulation for the Restructured Electric Power Industry in Massachusetts, MIT School of Engineering, Laboratory for Electromagnetic and Electronic Systems, LEES Working Paper wp-96-005, September, 1996.

AG Related

AG, Recent Contributions to the Theory and Measurement of Service Reliability, Task 1 Report, Prepared for Niagara Mohawk Power Corporation, September, 1987.

AG, Review of Existing Niagara Mohawk Power Corporation Procedures for Collecting Data on Outage Costs, Task 2 Report, Prepared for the Niagara Mohawk Power Corporation, September, 1987.

AG, The Design of Methods and Implementation Procedures to Collect Data on Customer Outage Costs and the Value of Service Reliability, Task 3 Report, Prepared for the Niagara Mohawk Power Corporation, January 1988.

AG, Customer Outage Costs and the Value of Service Reliability: Draft Analysis Plan for Residential and Large Commercial/ Industrial Customers, Draft Report prepared for the Niagara Mohawk Power Corporation, August 1988.

LECG Related

LECG, Optimal Plant and Firm Size in the Electric Power Industry: Report on Academic/Industry Literature, Report to the Division of Ratepayer Advocates, California Public Utility Commission, August, 24, 1989.

LECG, Analysis of Competitive Consequences and Efficiency Claims for the Proposed Merger Between Southern California Edison and San Diego Gas and Electric, Report to the Division of Ratepayer Advocates, California Public Utility Commission, December, 1989.

LECG, Report on the Proposed Merger of the Southern California Edison Company and the San Diego Gas and Electric Company, Report to the California Public Utilities Commission, Division of Rate Payer Advocates, Application 88-12-035, February, 1990, Exhibit 10,500;

LECG, A Critique of the Commodity Futures Trading Commission (CFTC) Study: "Economic Analysis of Dual Trading on Commodity Exchanges", Report prepared for the Coffee, Sugar and Cocoa Exchange, Inc., March, 1990

LECG, Report on the Proposed Merger of the Southern California Edison Company and the San Diego Gas and Electric Company -Surrebuttal: Econometric Analysis of Merger Impacts, Report to the California Public Utilities Commission, Division of Rate Payer Advocates, Application 88-12-035, July, 1990, Exhibit 10,511.

LECG, A Critical Analysis of the Proposed Merger Between Kansas Power and Light Company and Kansas Gas and Electric Company, Report to the Missouri Public Service Commission, March 25, 1991.

LECG, Petitioners' Economic Testimony in the Matter of Certain Carbon Steel Flat Products, Final Hearing before the United States International Trade Commission, June 29-30, 1993.

LECG, Petitioners' Post Hearing Brief in the Matter of Certain Carbon Steel Flat Products, before the United States International Trade Commission, July 7, 1993.

Hartman, "Returns to Scale and Scope in the Electric Utility Industry: Review of Existing Econometric Analyses and Examination of Their Applicability to the Proposed Merger Between Southern California Edison and the San Diego Gas & Electric Company," LECG Working paper, September, 1989.

Hartman, "Measuring Productivity for the United States Postal Services," Report to the Resource Technology Center of Arthur D. Little, Inc. and the United States Postal Services, January, 1991.

Hartman, "The Relevance of Incentive Regulation to the United States Postal Service," Report to the Resource Technology Center of Arthur D. Little, Inc. and the United States Postal Services, February, 1992.

Hartman, "The Relevance of Incentive Regulation for Environmental Policy Modeling," Report to the World Bank, February, 1992.

Hartman, "Issues in the Valuation and Aggregation of Goods and Services: A Concept Paper," Report to the World Bank, Socio-Economic Data Division, International Economics Department, May, 1992.

Hartman, "A Framework for the Spatial Development of Infrastructure: The Electric Power Industry," Report to the Government of Indonesia, Bappenas, Jakarta, July, 1992.

Hartman, "Stimulating Pollution Abatement Efforts in the Brantas River Basin," Report to World Bank, Indonesian Environmental Mission, Jakarta, August, 1992.

Hartman, "Policies to Control Emissions From Energy Production and Use in Thailand," Report to the World Bank, East Asia Country Operations, January, 1993.

World Bank, Thailand: Managing Environmental Impacts in a High-Growth Economy, Country Economic Report, April 5, 1993.

ADL Related

ADL, Growth Patterns of U.S. Industries and Markets in 1973: The Year Ahead, 1972.

ADL, Tourism in Maryland: Analysis and Recommendations, Report to the Maryland Department of Economic and Community Development, 1972.

ADL, Economic Impact Study of the Pollution Abatement Equipment Industry, Report to the Environmental Protection Agency, December 1972.

ADL, Economic Transition of Distressed Communities, An Analytical Study, Report to the Economic Development Administration, U.S. Department of Commerce, 1974.

ADL, Tourism in Maine: Analysis and Recommendations, Report to the Maine Vacation Travel Analysis Committee, May 1974.

ADL, Tourism in San Diego: Its Economic, Fiscal and Environmental Impacts, Report to the City of San Diego, November 1974.

ADL, The Economic Impact of Proposed OSHA Airborne Arsenic Standards, Report to the American Smelting and Refining Company, June 1975.

ADL, Preliminary Projections of New England's Energy Requirements, Report to the New England Regional Commission, September 1975.

ADL, Economic Impact of Environmental Regulations on the U.S. Copper Industry, Preliminary Rough Draft Report to the U.S. Environmental Protection Agency, 1976.

ADL, Pacific Gas and Electric Company Estimates of Energy Conservation Potential, 1980-2000, Report to the Public Utilities Commission of the State of California, June 1980.

ADL, Southern California Edison Estimates of Electricity Conservation Potential, Report to the Public Utilities Commission of the State of California, June 1981.

ADL, Southern California Edison Projections of Conservation Goals 1982-1986, Report to the California Public Utilities Commission for Southern California Edison, October 1981.

ADL, Estimate of Conservation Penetration for the Southern California Gas Company Service Area, 1981-1986, Report to the Southern California Gas Company, November 1981.

ADL, Electricity and Natural Gas Conservation Potential in the San Diego Gas and Electric Service Territory, Report to the Public Utility Commission of the State of California, April 1982.

ADL, Integrated Conservation Planning/Load Forecasting System Technical Users Guide, Report to San Diego Gas and Electric Company, Vols. I and II, Summer 1982.

ADL, A Method for Evaluating Residential Conservation Programs: Interim Report, Report to the Electric Power Research Institute, RP 1587, March 1983.

ADL, Measuring the Impact of Residential Conservation, Volume II: An Econometric Analysis of Portland General Electric Company Data, Report to the Electric Power Research Institute, EPRI EA-3606, Project 1587, September 1985.

ADL, Measuring the Impact of Residential Conservation, Volume III: An Econometric Analysis of General Public Utilities Inc. Data, Report to the Electric Power Research Institute, EPRI EA-3606, Project 1587, May 1986.

ADL, Measuring the Impact of Residential Conservation, Volumes IV: A Comparison of Alternative Methods, Report to the Electric Power Research Institute, EPRI EA-3606, Project 1587, May 1986.

ADL, Evaluation of EUA's Proposed Acquisitions of Unitil and Fitchburg Electric, Report to Gaston and Snow, March 12, 1990.

Hartman, "Critical Review of Selected Energy End-Use Models and Proposed Specifications for PG&E End-Use Modeling Efforts," Arthur D. Little, Inc., Working Memorandum #13 for Pacific Gas and Electric Co., June 1979, Arthur D. Little, San Francisco.

Hartman, "Potential State-of-the Art Energy Demand Models for Use in Developing an Integrated Natural Gas Forecasting and Conservation Planning System for Southern California Gas Company," Arthur D. Little Working Paper, June 1981, Arthur D. Little, San Francisco.

Hartman, "A Critical Review of the Delmarva 1981-2000 Load Forecast," with James C. O'Keefe, Arthur D. Little Working Paper, September 1981, Arthur D. Little, San Francisco.

Hartman, "Analyzing and Measuring the Effects of Utility Sponsored Conservation Programs," Arthur D. Little Energy Group Discussion Paper, September 1982, Arthur D. Little, San Francisco.

UNPUBLISHED WORKING PAPERS

"An Examination of the Use of Probability Modeling for the Analysis of Inter-fuel Substitution in Residential Fuel Demand," with M. Hollyer, MIT Energy Lab Working Paper #MIT-EL-77-018WP, July 1977.

"A Critical Survey of Three Copper Industry Models and Their Policy Uses," MIT Energy Lab Working Paper #MIT-EL-77-028WP, September 1977.

"The Evolutionary Model of Technical Change: Historical Evidence from Great Britain and the United States:, with D. Wheeler, mimeo, December 1977.

"A Critical Review of Single Fuel and Interfuel Substitution Residential Energy Demand Models," MIT Energy Laboratory Report #MIT-EL-78-003, March 1978.

"A Generalized Logit Formulation of Individual Choice," MIT Energy Laboratory Working Paper #MIT-EL-79-010WP, February 1979.

"A Model of Residential Energy Demand," MIT Energy Laboratory Working Paper, #MIT-EL-79-041WP, August 1979.

"The Incorporation of Solar Photovoltaics into a Model of Residential Energy Demand," MIT Energy Laboratory Working Paper #MIT-EL 80-014WP, May 1980.

"Consumer Choice Among Alternative Fuels and Appliance Technologies: An Analysis of the Effects of Alternative Energy Conservation Strategies," MIT Energy Laboratory Working Paper #MIT-EL 82-036WP, June 1982.

"Estimation of Hedonic Supply Curves For Residential Water Heaters Using Technical Data and Federal Testing Guidelines," with Alan Cox and Mary Litterman, MIT Energy Laboratory Working Paper #MIT-EL 82-037WP, June 1982.

"A Monte Carlo Examination of the Heckman and the Manski-Lerman Estimators in Discrete/Continuous Models of Demand," October 1986.

"The Value of Service Reliability: Alternative Welfare Measures," with C.K. Woo, October, 1988.

"The Use of Hedonic Analysis in Defining and Measuring Market Size: The Extension of the Merger Guidelines to Heterogeneous Products," Working Paper No. 91-12, Program in Law and Economics. School of Law, Boalt Hall

SELECTED CONSULTING ASSIGNMENTS AND EXPERT TESTIMONY/DEPOSITION

1972-1975: In consultation with Arthur D. Little, Inc., Dr. Hartman developed economic impact models to assess the effects of environmental regulations upon the U.S. pollution abatement equipment industry and upon a particular U.S. copper smelting company.

1972-1975: In consultation with Arthur D. Little, Inc., Dr. Hartman developed economic models to assess the regional macroeconomic and industrial impacts of alternative strategies to promote tourism-related industries. The models were used in the United States by the states of Maryland and Maine and for the Philadelphia Bicentennial Commission. Internationally, the models were used by the Ministry of Planning of Mexico to assess the national and regional importance of tourism coming into Acapulco.

1976-1977: Consultation with Arthur D. Little, Inc. for the U.S. Environmental Protection Agency. The effort involved the design, estimation and implementation of an econometric simulation model that was used to assess the impact of pollution abatement legislation on the U.S. copper industry. The model was designed to incorporate engineering cost estimates attributable to the abatement legislation while accounting for the noncompetitive pricing behavior in the industry. The model was used to evaluate and revise proposed abatement legislation. This analysis was the basis for Dr. Hartman's Ph.D. dissertation and several of his publications.

1977-1982: As an expert for Kohn, Milstein, Cohen and Hausfeld, Dr. Hartman analyzed the presence of a price-fixing conspiracy among the major U.S. copper producers during the 1970's. His testimony addressed issues of liability and developed a model of damages. See

Affidavit to United States District Court for the Southern District of New York, J.N. Futia Co., Inc., Plaintiff, Against Phelps Dodge Corporation, et al., Defendants, 78 Civ. 4547 (ADS), 1978.

Deposition for United States District Court, Southern District of New York for Reading Industries, Inc., et al. (Plaintiffs) against Kennecott Copper Corporation, et al. (Defendants), 17 Civ. 1736 (MEL), 1982.

1977-Present: One of Dr. Hartman's main areas of expertise and experience involves regulated industries and electric and gas utilities. His consulting assignments have included load forecasting, evaluation of conservation and load management programs, econometric cost analysis, analysis of revenue requirements and rate-making, analysis of value of service reliability, the analysis of mergers and acquisitions, and the analysis of industry restructuring. In these assignments, Dr. Hartman has consulted for such clients as Arizona Public Service, the Pacific Gas and Electric Company, the Southern California Edison Company, the Southern California Gas Company, the San Diego Gas and Electric Company, Portland General Electric Company, Bonneville Power Administration, General Public Utilities, Northeast Utilities, Niagara Mohawk Power Corporation, the Delmarva Power Corporation, Florida Power Corporation, Sithe Energies, the California Energy Commission and Public Utilities Commission, the Missouri Public Service Commission, the Rhode Island Division of Public Utilities, the Attorney General of the State of Massachusetts, the Electric Power Research Institute, the Gas Research Institute, the U.S. Department of Energy, the World Bank, and the governments of Indonesia and Thailand. This experience is reflected in the majority of his publications and reports.

He has also submitted analysis to the California Energy Commission. See

Statement of Opinion and "Critical Review of Selected Energy End-Use Models and Proposed Specifications for PG&E End-Use Modeling Efforts," entered into the California Energy Commission Hearings on Utility Construction and Siting, November 26-30, 1979.

1984: Testifying expert for the class of all individuals who employed the services of members of Massachusetts Furniture and Piano Movers Association. The analysis developed an econometric model to assist in certifying the class and measuring the damages common to that class. See

Affidavit to United States District Court for the District of Massachusetts in the Matter of Kenett Corporation et al v. Massachusetts Furniture and Piano Movers Association Inc. et al, May 1984, Civil Action No. 82-140-Z.

1984-1986: In consultation with the U. S. Postal Service, Dr. Hartman identified appropriate econometric methods for analysis of the determinants of Postal Service costs. The particular methods he suggested were "hedonic" cost techniques, which are specifically designed to account for the fact that both increased levels of production and improved product attributes increase costs. The techniques assisted the Postal Service in quantification of the cost impacts of the attributes of service quality for alternative classes of service. For example, the techniques allowed for estimation of the differential cost impacts of alternative service priorities, size and weight attributes of the various classes of mail.

He later applied these techniques for a group of second class mailers. The analysis was introduced before the Postal Service Commission to assess whether proposed postal rate changes reflected actual costs.

1984-1986: The development of econometrically-based strategic planning models, which allow for estimation of the effects on corporate profits of alternative product design and pricing strategies. The models allow for examining specific design strategies by explicitly incorporating detailed product attributes. The models were developed for Westin Hotels and Shell Oil. The Westin models have been implemented into an interactive PC tool that facilitates pricing decisions at the front desk.

1985: For analysis presented before the International Trade Commission, Dr. Hartman helped develop and estimate a model to evaluate the domestic effects of importation of certain synthetic aramid fibers. The analysis was used in adjudicating an international patent infringement complaint.

1985-1986: Dr. Hartman participated in an analysis of one of the nation's largest mutual funds. The study was undertaken as part of a class action alleging inappropriate management fees. The study assessed competition in the money market mutual fund industry. It measured investors' sensitivity to changes in yield and to the level of services provided. It also statistically identified the determinants of the costs of providing mutual fund services.

1985-1986: The development for GTE Laboratories of econometric demand models for analysis and measurement of the determinants of demand for telecommunications services. The models explicitly address the separate customer decisions to subscribe to one of several telecommunications carriers and the demand for telecommunications services, conditional upon the subscription decision. The analysis was employed by GTE to assist their subsidiary, GTE Sprint, in the design of marketable services, where the services were differentiated by tariff, perceived service quality, provider reputation, and specialized customer services. The analysis is summarized in the paper

"Estimation of Household Preferences for Long Distance Telecommunications Carrier", Journal of Regulatory Economics, Volume 6, 1994.

1985-Present: Dr. Hartman has performed a variety of economic damage analyses in cases of personal injury, wrongful injury and wrongful death. He has worked for both plaintiff and defendant. He has been deposed in such matters as recently as 1995.

1986: For a major natural gas pipeline, preparation of an analysis of the effects of natural gas deregulation as proposed in the Federal Energy Regulatory Commission's Notice of Proposed Rulemaking No. 436.

1986-1987: Working for the class of owners of selected General Motors' X Cars and VW Rabbits, Dr. Hartman specified and estimated econometric models that assisted in the certification of class and estimation of class damages. The damages flowed directly from allegedly-concealed design flaws in these automobiles. The methods are described in

"The Use of Hedonic Analysis for Certification and Damage Calculations in Class Action Complaints," with M. Doane, The Journal of Law, Economics and Organization, Fall, 1987.

1986-1987: Development of damage models for litigation in high technology industries. The models were developed in several cases. One involved alleged patent infringement by a major Japanese semiconductor firm, and the second involved market foreclosure of a domestic minicomputer emulator. In these efforts, Dr. Hartman developed econometric models to estimate the market potential, absent the violation, for the particular product foreclosed or whose patent was infringed. The methods are described generically in

"Product Emulation Strategies in the Presence of Reputation Effects and Network Externalities: Some Evidence from the Minicomputer Industry," with D. Teece, Economics of Innovation and New Technology, Volume 1, 1990.

1987: Analysis of the competitive effects of relaxing the restrictions on the Bell Regional Operating Companies regarding their vertical extension upstream into equipment manufacture and downstream into the provision

of selected telecommunication services. The study was introduced before Judge Greene in the triennial review of the divestiture of the Bell operating companies from AT&T.

1987-1988: For a major gas utility, participation in analysis of the economic effects arising if bypass of an existing pipeline were allowed by state and federal regulation. The analysis developed methods for assessing when competitive bypass is socially desirable. The analysis also developed and used an econometric model to simulate the effects of bypass on demand and prices.

1988: Analysis of the competitive effects the acquisition of trade secrets through the predatory hiring of a competitor's essential labor force. See

Analysis submitted in testimony in the case *Universal Analytics Inc. v. MacNeil Schwendler, Corp.*

1988-1989: As part of their proposed acquisition of Public Service of New Hampshire, Dr. Hartman was retained by Northeast Utilities, Inc. to develop and estimate load forecasting models. The models were used to assess the demand implications of alternative rate assumptions proposed as part of the acquisition. The forecasts were introduced as part of Northeast Utilities' filings before the bankruptcy court, the state public utility commissions, the SEC and the FERC.

1989: As part of major antitrust litigation against the leading vendors of airline computer reservation systems, Dr. Hartman helped develop liability analysis and models for the estimation of damages.

1989: As a proposed testifying expert for Parnelli Jones, Inc., Dr. Hartman analyzed the antitrust implications of Firestone's retail trade practices, particularly alleged vertical and horizontal restraints of trade. He designed damage models for the alleged violations.

1989 - Present: Dr. Hartman has performed and continues to perform the market analyses required for Hart-Scott-Rodino applications and second requests supporting mergers and acquisitions in a variety of industries, including specialty chemicals, airlines, health care and medical diagnostic products, and energy products and services.

1989-1990: Dr. Hartman participated as a principal investigator and testifying expert for the Division of RatePayer Advocates of the California Public Utility Commission in an analysis of the economic and legal implications of the proposed merger between Southern California Edison Company and San Diego Gas and Electric Company. Dr. Hartman's responsibilities included overall study design, econometric analysis of scale and scope economies arising with the merger, and analysis of efficiencies purportedly arising with the coordination of the demand-side management programs of the two utilities. His direct and surrebuttal testimony is found in

California Public Utilities Commission, Division of Rate Payer Advocates, Report on the Proposed Merger of the Southern California Edison Company and the San Diego Gas and Electric Company, Volume V, Chapter II, Application 88-12-035, February, 1990, Exhibit 10,500; and

California Public Utilities Commission, Division of Rate Payer Advocates, Report on the Proposed Merger of the Southern California Edison Company and the San Diego Gas and Electric Company, Surrebuttal: Econometric Analysis of Merger Impacts, Application 88-12-035, July, 1990, Exhibit 10,511.

1989-1990: Working with Arthur D. Little, Inc., Dr. Hartman participated as a principal investigator and proposed testifying expert in a merger study for several small New England utilities within Nepool. Dr. Hartman designed and implemented a statistical study of returns to scale and scope in the industry. Using the statistical results, Dr. Hartman developed opinions regarding the efficiency effects of the proposed merger. His analysis appears as an independent Appendix to

Arthur D. Little, Inc., Evaluation of EUA's Proposed Acquisitions of UNITIL and Fitchburg, Report to Gaston and Snow, March 12, 1990, presented in support of the acquisition to the Securities and Exchange Commission and the New Hampshire Public Utilities Commission.

1990: Working for a group of commodity futures exchanges, Dr. Hartman participated as Principal Investigator in a critical review of a statistical and econometric study performed by the Commodity Futures Trading Commission. The CFTC study was developed to assess the effects of dual trading on commodity futures markets, in order to implement proposed regulations curtailing such trading.

1990: Working with Barakat and Chamberlin, Inc., Dr. Hartman developed a Ramsey pricing model for Arizona Public Service Corporation. The Ramsey pricing model was used to develop and explore alternative rate strategies for a variety of residential, commercial and industrial market segments. The analysis was submitted in formal rate hearings.

1990-1992: Working with the Technology Research Center of Arthur D. Little, Inc. for the United States Postal Service, Dr. Hartman specified and estimated econometric models to analyze the determinants of productivity for the largest 120 post offices in the United States. The econometric models are being used to identify the most and least productive offices, with the purpose of learning from the performance of the most productive offices in order to improve the performance of the least productive offices. The models are being used to design and implement incentive regulation mechanisms to increase productivity across post offices.

A second set of econometric models have been specified and estimated to quantify the effects of the attributes of alternative postal services and rate classes upon total postal service costs. The results of this analysis are being used to design postal rates for alternative classes of service which reflect the real costs of providing the services. The analysis and its results will be introduced into the postal rate hearings.

1990-1997: Working with the World Bank, Dr. Hartman has specified and is estimating a set of econometric models to measure both the level and types of pollutants emitted by United States plants and establishments and the costs of abating those pollutants. The models identify and quantify, at the plant level, the relationship between the emission of approximately 300 pollutants and the scale of production, the types of technology used, the age and characteristics of the plant and equipment used, the extent to which abatement equipment has been installed, and the costs (capital and operating) of abating alternative pollutants.

The models will be used in the following ways in developing countries and Eastern European countries: to assist the countries to predict and assess the environmental implications of reliance upon certain technologies and industries in development; to assess the effectiveness of alternative regulatory methods for abating pollution, including effluent standards, effluent taxes, effluent licenses, technology standards, effluent banks, and alternative property right schemes; to implement incentive regulation mechanisms to better stimulate abatement compliance; and to identify and prioritize those industries that can abate certain pollutants at least cost.

As part of this effort, Dr. Hartman has also designed a specific incentive regulation system for pollution abatement compliance in Indonesia. The system is based upon the most recent theory in regulated incentive mechanisms. The system will ultimately evolve into an effluent bank or a system of effluent fees. If the effort is successful, it will form the basis for environmental institutions in other developing countries. In the process of designing this system, he has reviewed the institutional and statutory basis for environmental policy in Indonesia.

Also as part of this work, Dr. Hartman is in the process of designing the institutional and statutory structures for Environmental Protection Agencies in a variety of developing countries. The institutional structures will be designed to articulate and implement pollution abatement policies that are informed by the econometric modeling described above.

1991: Dr. Hartman participated as a principal investigator and testifying expert for the Missouri Public Service Commission in a critical analysis of the proposed merger between Kansas Power and Light Company and Kansas Gas and Electric Company. Dr. Hartman's responsibilities included overall study design, analysis of scale and scope economies arising with the merger, analysis of unanticipated transitional cost arising with the merger and an econometric event study of the stock market's response to the merger. His testimony appears in

A Critical Analysis of the Proposed Merger Between Kansas Power and Light Company and Kansas Gas and Electric Company, Report to the Missouri Public Service Commission, March 25, 1991.

1991: Working for the Resolution Trust Corporation in its litigation against Michael Milken and Drexel Burnham Lambert Inc., Dr. Hartman developed data and econometric models to measure the size of the relevant antitrust markets dominated by Drexel and to estimate the size of the economic damages produced by Drexel's alleged monopolization of those markets.

1991-1992: Working for the Indonesian government and the United States Agency for International Development, Dr. Hartman critically reviewed the structure of the Indonesian electric power industry and the institutions regulating that industry. The purpose of the analysis was to assist the government with privatizing their energy industries. His analysis focused upon the following: developing better data and models for predicting demand and supply; identifying and implementing more efficient industrial structures; and developing better regulatory regimes.

1992: Working for the World Bank, Dr. Hartman designed methods to measure and compare the social value of the environmental effects of alternative development projects, at the microeconomic and macroeconomic levels. His analysis focused upon standard and contingent valuation survey approaches and their use in econometric settings.

1992-1993: Working for the World Bank in Bangkok, Dr. Hartman characterized and critically analyzed the environmental effects of Thailand's energy use patterns. He focused upon the use and production of electric power, petroleum, coal and natural gas. He developed recommendations for environmental policy changes that included, but were not limited to, fuel taxes, effluent standards, technology standards, and privatization of environmental monitoring within a "bubble" policy approach.

1992-1993: Working for a biomedical company (a producer of vascular grafts) in an antitrust situation, Dr. Hartman designed and implemented survey techniques and econometric models to measure the size of the relevant markets and market power within those markets.

1992-1993: In a proceeding before the International Trade Commission, Dr. Hartman critiqued ITC econometric methods used for estimating elasticities of demand, supply and substitution among domestic and imported products. His focus was selected steel products. He formulated and estimated alternative models and methods to improve the existing estimates. He developed presentation materials for the Commission and testified before the Commission. His testimony is included in

LECG, Petitioners' Economic Testimony in the Matter of Certain Carbon Steel Flat Products, Final Hearing before the United States International Trade Commission, June 29-30, 1993; and

LECG, Petitioners' Post Hearing Brief in the Matter of Certain Carbon Steel Flat Products, before the United States International Trade Commission, July 7, 1993.

1992-1997: Working for the World Bank, Dr. Hartman has designed and is currently implementing a set of regional econometric/ engineering models that accurately portray and predict the economic, environmental, infrastructural and socio-demographic effects of large-scale, World-Bank-funded infrastructural projects. The models combine input-output and econometric methods.

Given the Bank experience that many of their financially-sponsored projects create significant unanticipated environmental effects, the models are designed to be broad and comprehensive enough to incorporate and predict all important effects. The models systematically characterize the relationship between resource-based economic growth and the regional environment in which that growth occurs.

The models are currently being implemented for assessing project developments in the Carajas region of the Brazilian Amazonian rain forest, which is a large, dynamic and ecologically sensitive frontier area. The methods implemented for Brazil will be generalized for analysis of economic growth in ecologically similar areas, such as the

Lake Baikal region of the former Soviet Union.

1993-1994: Working for the Commonwealth of the Northern Mariana Islands, Dr. Hartman developed and presented testimony rebutting a complaint by the United States Department of Justice that the Public School System of the Commonwealth practiced employment discrimination against teachers of Filipino and native Carolinian origin. Dr. Hartman's testimony examined both hiring and compensation practices. His testimony included hedonic regression analysis of the market for public school teachers in the islands. This analysis measured how teacher attributes and qualifications determined teacher salaries and hiring. The results of the analysis indicated that salary differentials resulted from differences in teacher qualifications rather than discrimination.

1993-Present: Working either as the testifying expert or supporting other testifying experts, Dr. Hartman has participated in a variety of patent infringement cases. He has developed, supported and estimated alternative theories and measures of damages for manufacturers of coaxial cable and a variety of alternative medical devices.

1993-1998: Working as the testifying expert, Dr. Hartman developed models estimating the damages to the business of a construction general contractor that were caused by the malicious prosecution of the contractor's insurance company.

1994: Working for the United States Wheat Associates in a proceeding before the ITC, Dr. Hartman designed and implemented an econometric study to assess and quantify the extent to which Canadian Wheat Board imports into the U.S. undersold domestic supplies and thereby materially interfered with the United States Department of Agriculture Wheat Program. The econometric study was hedonic. The study measured how non-price attributes are valued in U.S. wheat markets. The non-price attributes analyzed included such things as protein content, shipment defects, moisture content and a number of end-use performance characteristics. Having measured the value of these attributes in U.S. markets, the analysis indicated how the Canadian Wheat Board fixed import prices below market levels, given the attributes of the imported wheat.

1994: Working as a testifying expert for Gallo Wines in a proceeding before the ITC, Dr. Hartman designed and implemented a statistical study of the US wine industry that analyzed the impacts of Chilean wine imports upon the domestic industry that would result from the inclusion of Chile in a Free Trade Agreement with the US.

1994: Working as a testifying expert for an insurer of a member of the Asbestos Claims Facility and Center for Claims Resolution, Dr. Hartman developed a statistical analysis estimating alternative indemnification liabilities expected under the Settlement Share Analysis of the Center for Claims Resolution and under the tort system. The results were used to make strategic decisions regarding the desirability of participating in the Class Action Settlement relative to litigating the claims.

1994: Working for several regional Bell Operating companies, Dr. Hartman has developed models and survey procedures to analyze and quantify the determinants of demand for local services, long-distance services and PCS services. The models quantify how consumers respond to and select among alternative carriers who differentiate their services by performance attributes and vendor reputation. The models also estimate the level of service demand, conditional upon the selection of service vendor. The models are being used to quantify the nature of competition among local carriers and long-distance carriers in the Intralata market. The models are also being used to help develop bidding strategies for specific RBOCs as they participate in the FCC auctions for the PCS spectra.

1995: Working as a testifying expert for a group of independent television stations and program producers, Dr. Hartman developed an econometric analysis of the impacts of the Prime Time Access Rule (PTAR) upon the economic performance of independent television stations. The analysis was submitted to the Federal Communications Commissions as part of their consideration of the repeal of the Rule. Dr. Hartman's analysis proved that PTAR had a strong, statistically significant effect upon the economic performance of these stations, and that its repeal would adversely impact them.

His testimony is included in

The Economic Effects of Repealing the Prime Time Access Rule: Impact on Broadcasting Markets and the Syndicated Program Market, Report prepared by LECG and presented before the Federal Communications Commission, MM Docket No. 94-123, March 7, 1995.

1995: Working for a big six accounting firm, Dr. Hartman designed and implemented a hedonic regression analysis to calculate transfer prices under the comparable uncontrolled price (CUP) method. The analysis is discussed in

"The Use of Regression Techniques in Transfer Price Analysis," with Delores Wright and J.D. Opdyke, European Taxation, 1996.

1995-1996: Working as the testifying expert for a major high tech firm in New England, Dr. Hartman has developed rebuttal and affirmative testimony to rebut claims of age discrimination in the termination of a group of employees over forty. His rebuttal testimony involved critically reviewing statistical analyses purporting to demonstrate disparate treatment and disparate impact. His affirmative testimony has involved designing and implementing econometric models to identify and estimate those factors actually determining the compensation and termination decisions of the defendant.

1995-1996: Working as the testifying expert for the Office of Attorney General of the State of Massachusetts, Dr. Hartman has analyzed and helped develop the State's positions on the following issues: restructuring the electric utility industry in Massachusetts and New England; regulating those entities in the restructured industry that will remain subject to regulation; and valuing those assets that may be stranded as a result of restructuring. As part of the effort, Dr. Hartman also critically reviewed the restructuring proposals of the largest utilities in the state. His testimony appears in

"The Market for Power in New England: The Competitive Implications of Restructuring," a report prepared for the Office of the Attorney General, Commonwealth of Massachusetts and submitted February 16, 1996 in support of their filing to the Department of Public Utilities as part of DPU 95-30, which was initiated August 15, 1995.

1995-1996: Working as the testifying expert, Dr. Hartman represented Florida Power Corporation in a contract dispute with Independent Power Producers. His analysis and testimony focused upon issues of damages incurred as a result of a breach of contract.

1995-1999: Working with a team of economists, Dr. Hartman represented the group of wholesalers in the retail prescription drug price fixing conspiracy case. His efforts included industry analysis and participation in cross examination of plaintiffs' experts.

1996: Working as the testifying expert for the Division of Public Utilities of the State of Rhode Island, Dr. Hartman has analyzed and helped develop the State's positions on restructuring the electric utility industry in Rhode Island and New England, for both the State's Public Utilities Commission and the FERC. As part of the effort, Dr. Hartman also critically reviewed the restructuring proposals of some of the utilities in the state. His testimony appears in

"The Division Plan to Restructure the Electric Utility Industry in Rhode Island," Volume 2 of Supporting Testimony to the State of Rhode Island and Providence Plantations Public Utilities Commission, in re: Electric Industry Restructuring, Docket 2320, April 12, 1996.

1996: Working with a team of engineering firms, an international investment banking firm, a big six accounting firm and several national law firms, Dr. Hartman developed models of demand, supply and futures markets in restructured electric power markets to assist a major industry participant in evaluating specific alternative acquisition strategies.

1996: Working with a team of economists developing evidence for presentation before the High Court of New Zealand, Dr. Hartman critically reviewed and rebutted a variety of econometric analyses of natural gas markets and more broadly-defined energy markets in New Zealand. These analyses were used to determine the size of antitrust markets for a variety of energy products.

1996: Dr. Hartman was retained by a major mid-west utility to critically review and rebut analyses and evidence presented before the FERC and the relevant State Commissions concerning the competitive impacts of the proposed Primergy merger.

1996-Present: Working as the testifying expert, Dr. Hartman analyzed the employment practices and procedures of the Florida Power Corporation during a reduction in force, to assess the validity of a complaint that those practices and procedures resulted in a pattern of age discrimination. In his testimony, Dr. Hartman implemented a variety of statistical and econometric analyses to address and quantify claims of disparate impact and disparate treatment.

1996-1997: Working for US Airways with a team of economists, Dr. Hartman specified and estimated a variety of econometric consumer choice models to measure customer preferences for the services of alternative air carriers in a cross section of US-European origin-destination markets. The models were used to evaluate the economic impacts of both the proposed alliance between American Airlines and British Airways and alternative proposals to condition that alliance.

1996-1997: Working as the testifying expert, Dr. Hartman represented a major national retail pharmaceuticals wholesaler in litigation brought by a regional distributor alleging monopolization of wholesale services to distinct classes of trade. His analysis addressed market definition, the analysis of competition generally and analysis of the competitive impact of specific contractual arrangements.

1997: Working with a team of experts, Dr. Hartman analyzed economic impacts of the construction of the Warrior Run Cogeneration plant which was under construction in Western Maryland and was contracted to sell power to Allegheny Power System's (APS) Maryland subsidiary, Potomac Edison.

1997: Working as the testifying expert for the Office of Ratepayer Advocates of the California Public Utilities Commission, Dr. Hartman critically reviewed the efficiencies estimated by Applicants to be induced by the proposed merger of Pacific Enterprises and Enova Corporation.

1997: Working with a team of economists, Dr. Hartman prepared affirmative and rebuttal testimony in a breach of contract matter in the pharmaceutical industry arbitrated before the International Chamber of Commerce.

1997-1998: Working as the testifying expert, Dr. Hartman developed analysis supporting certification of class and estimation of damages for the class of purchasers of thermal fax paper in the US over the period 1990-1992 who were damaged as a result of a price fixing conspiracy by major suppliers.

1998: Working as the testifying expert, Dr. Hartman analyzed the employment practices, procedures and personnel data of the Florida Power Corporation, in general and in particular, to assess the validity of a complaint that a specific employee had been subjected to racial discrimination.

1998-1999: Working with a team of economists for the Office of the Attorney General of the State of Massachusetts, Dr. Hartman developed and implemented econometric models to analyze and measure the health care costs arising under the Medicaid program that have been attributable to smoking. The analysis appears in the following documents:

David M. Cutler, Arnold M. Epstein, Richard G. Frank, Raymond S. Hartman, Charles King and Joseph P. Newhouse, *The Impact of Smoking on Medicaid Spending in Massachusetts: 1970-1998 -- Report on Methods*, June 15, 1998;

David M. Cutler, *et. al.*, *The Impact of Smoking on Medicaid Spending in Massachusetts: 1970-1998 -- Results From The Inclusive Approach for Adults*, July 1, 1998;

David M. Cutler, *et. al.*, *The Impact of Smoking on Medicaid Spending in Massachusetts: 1991-1998 -- Results From The Disease-Specific Approach for Adults and Overall Summary*, July 11, 1998.

Drawing upon these efforts, Dr. Hartman worked with the same team of experts to analyze the economic impacts of the Master Settlement Agreement and to present their findings to the Tobacco Fee Arbitration Panel.

1999: Working as one of two testifying experts for the Office of the Attorney General of the Commonwealth of Massachusetts, Dr. Hartman critically analyzed potential rate increases relevant to Joint Petitions introduced by both Eastern Enterprises/Colonial Gas Company and Boston Edison/Commonwealth Energy Systems. His testimony appears as

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of the Massachusetts Attorney General, in the matter of the Joint Petition of Eastern Enterprises and Colonial Gas Company For Approvals of Merger Pursuant to G.L. c. 164, §§ 96 and 94, DTE 98-128, March 26, 1999.

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of the Massachusetts Attorney General, in the matter of the Joint Petition of Boston Edison Company, Cambridge Electric Light Company, Commonwealth Electric Company and Commonwealth Gas Company For Approval of Rate Plan Pursuant to G.L. c. 164, §§ 76 and 94, DTE 99-19, April 30, 1999.

1999: Dr. Hartman was retained by a group of industrial purchasers of copper to develop and implement methods and models to assess liability and measure damages in the matter involving the manipulation of the spot and future prices of copper on the London Metals Exchange by Sumitomo Corporation and Yasuo Hamanaka over the period 1987-1996.

1999: Working with the testifying expert, Dr. Hartman assisted in the development of data and models needed to certify class and measure damages in a price fixing case involving a manufacturer of generic drugs.

EXHIBIT A-2

B - 78

Attachment A.2: Raymond S. Hartman Selected Testimony List

**RECENT TESTIMONY OF RAYMOND HARTMAN
AT DEPOSITION, HEARING OR TRIAL**

1993

Petitioners' Economic Testimony in the Matter of Certain Carbon Steel Flat Products, Final Hearing before the United States International Trade Commission, June 29-30, 1993 (hearing)

Petitioners' Post Hearing Brief in the Matter of Certain Carbon Steel Flat Products, before the United States International Trade Commission, June 29-30, 1993 (hearing)

1994

United States of America v. Commonwealth of the Northern Mariana Islands, et. al., Civ. No. 92-0016, 1994 (deposition)

1995

The Economic Effects of Repealing the Prime Time Access Rule: Impact on Broadcasting Markets and the Syndicated Program Market, report presented in informal hearings before the Federal Communications Commission, MM Docket No. 94-123, March 7, 1995

Gillam v. Abex, et. al., San Francisco Superior Court No. 966241, 1995 (deposition)

Trilogy Communications Inc. v. Times Fiber Communications & LPL Technologies Inc., United States District Court for the Southern District of Mississippi, Jackson Division, Civil Action No. J91-0542 (W)(S), 1995 (deposition)

1996

Hall v. Abex, et. al., San Francisco Superior Court No. 958853, 1996 (deposition)

Sowers v. Abex, et. al., San Francisco Superior Court No. 949184, 1996 (deposition)

1997

Hillenbrand v. INA/Aetna, Sacramento County Superior Court No. 519223, 1997 (deposition)

1998

Hillenbrand v. INA/Aetna, Sacramento County Superior Court No. 519223, 1998 (trial)

Trilogy Communications Inc. v. Pennie & Edmonds, LLP, et. al., United States District Court for the Southern District of Mississippi, Jackson Division, Civil Action No. CIV-3:97CV722BN (deposition)

Paper Systems Incorporated v. Mitsubishi Corporation; Mitsubishi International Corporation; Mitsubishi Paper Mills Ltd.; Elof Hansson Paper & Board, Inc.; Kanzaki Specialty Papers, Inc.; Oji Paper Co., Ltd.; and Nippon Paper Industries Co., Ltd. (Civil Action No. 96-C-959), consolidated with *Graphic Controls Corp. v. Mitsubishi Corporation; Mitsubishi International Corporation; Mitsubishi Paper Mills Ltd.; Appleton Papers, Inc.; Elof Hansson Paper & Board, Inc.; Kanzaki Specialty Papers, Inc.; Oji Paper Co., Ltd.; and Nippon Paper Industries Co., Ltd.* (Civil Action No. 97-C-412) and *Victor Paper Roll Products, Inc. v. Mitsubishi Corporation; Mitsubishi International Corporation; Mitsubishi Paper Mills Ltd.; Appleton Papers, Inc.; Elof Hansson Paper & Board, Inc.; Kanzaki Specialty Papers, Inc.; Oji Paper Co., Ltd.; and Nippon Paper Industries Co., Ltd.* (Civil Action No. 97-C-508), United States District Court for the Eastern District of Wisconsin (deposition)

1999

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of The Massachusetts Attorney General in. re. the Joint Petition of Eastern Enterprises and Colonial Gas Company for Approvals of Merger Pursuant to G.L. c. 164 §§ 96 and 94, before the Department of Telecommunications and Energy, D.T.E. 98-128 (hearing)

Joint Testimony of Seabron Adamson and Raymond Hartman on Behalf of The Massachusetts Attorney General in. re. the Joint Petition of Boston Edison Company, Cambridge Electric Light Company, Commonwealth Electric Company, and Commonwealth Gas Company for Approval of Rate Plan Pursuant to G.L. c. 164 §§ 76 and 94, before the Department of Telecommunications and Energy, D.T.E. 99-19 (hearing)

Prior to 1993

Appearances at trial and hearing prior to 1993 are described in Dr. Hartman's CV.

EXHIBIT B-1

Attachment B.1: Tooth Product Lines by Company

	Trubyte	Ivoclar	Vita	Universal	Austenal/ Myerson&Kenson	American Tooth
Premium	Trublend SLM (ant/post)	SR Orthosit Pe (post)	Lumin Vacuum	Polychrome-VF/Plastic	Dura-Blend Special	
	Portrait IPN (ant/post)	SR Orthotyp-PE	VitaPan	Univac-VF	Dura-Blend	
	Bioblend IPN (ant)	SR Vivodent PE		Verident	Swissedent	
	Biostabil IPN (post)	SR Antares*		Truform VF/Plastic		
	Bioform IPN (ant/post)	SR Postares*		Uniform VF		
Medium		SR Vivoperl*		Unilux VF		
				Veriform Plastic		
	Bioblend (ant)	SR Orthotyp			DB Plus	Justi-Imperial
	Bioform (ant/post)	SR Vivosit			Kenson	Justi Blend
	Biotone (ant/post)					
Economy	Dentron (post)					
	New Hue (ant/post)					
	Classic (ant/post)			Econocryl Plastic	Kenson Econ/Midline	Dymon-Hue
Porcelain	Bioblend (ant)					
	Bioform VF (ant)					
	New Hue VF (ant)					
	Bioform VF (post)					
	New Hue AF (ant)					
	Solarex VF (ant/post)					

SOURCES

Exhibit F in Dentsply Report to the DOJ, April 18, 1997; Trubyte price list, DPLY-A 025779-80.
 * Turner Ex 14 (DPLY A 065510) and 1999 Ivoclar NA Inc Tooth Strategies (IVO 100370-435)

NOTES

- All premium, medium and economy teeth of Trubyte are plastic.
- Turner (p. 49) claims that Bioform and Bioblend regular plastic teeth are the lowest quality premium teeth and Biotone the highest quality medium tooth. This seems vary with above.
- Turner (p. 52) says Antaris and Postaris are superpremium, as is Trublend SLM.
- Turner, Ex. 6 summarizes customer surveys over 5 years comparing (in terms of aesthetics, shade matching) Portrait IPN (A2/B2); Vita (A2/B2), Ivoclar (Vivodent/Vivosit), Myerson (DB+), Universal Polychrome, Justi JustiBlend, Portrait/IPN Bioform, Bioblend Porcelain 109.
- Turner (p. 161) indicates that prior to Portrait IPN, Trubyte had lower esthetics than Vita, Ivoclar, Universal, Myerson and Justi.

Attachment B.1

1 / 1

EXHIBIT B-2

B - 84

Attachment B.2: Selected Tooth Product Pricing by Company

	CURRENT PRICING					
	SLM		IPN		VITA	
	Retail	LR	Retail	LR	Retail	LR
1x6	49.95	24.95	39.85	21.90	33.35	15.00
1x8	22.95	11.45	16.85	10.15	16.45	7.40
1x14	72.90	36.40	56.70	32.05	49.80	22.40
Profit		36.50		24.65	(-32%)	27.40
		50%		43.5%	(-34%)	55%
						23.45
						47.5%

SOURCE

Dentsply document DS 027563.

EXHIBIT B-3

Attachment B.3: Manufacturer's Characteristics

Manufacturer	Pricing Retail/Lab	Distribution	Return & Exchange Policies	Pricing Discounts	Credit Terms
PTC/SWISSEDENT					
Premium Porcelain		San Jose, CA	Full exchange privileges on Anteriors & Posteriors Porcelain & Plastic complete sets	30% Lab Rate	30days
900 Anteriors	\$35.40/17.70			40% /Order \$2,675	Hold shipment
Premium Plastic		Direct only		50% /Order \$4,460	w/Unpaid Balance
Swissdent Ants	31.14/15.57		25% Surcharge	Lab is advised when new minimum order is required to maintain 40% & 50% rates	
AMERICAN TOOTH					
Premium Plastic		Oxnard, CA	* 30% return limitation of broken sets against new order	Premium Plastic	30days
Regal D Blend	27.25/7.25		*All returns must be accompanied by a tooth order for the same tooth line	50% - 74% range	2% of unpaid balance
RA	22.00/11.20	Dealer/Direct	*No full set returns will be accepted without prior consent in writing	Medium Plastic	
Blend	27.25/7.25		*Approved returns must not be more than 40% of the dollar value of the new tooth order	40% - 57% range	
Imperial	21.80/6.75		*Teeth returned must have been purchased no more than one year before the date of return	Economy Plastic	
Medium Plastic			*Proof of purchase must be attached	85% plastic	
Exactone	10.00/6.00			Heavy Substitution	
Super Lux	23.00/9.85				
Economy Plastic					
Dymon Hue Hpt.	19.00/2.95				
DENTORIUM					
Dentorium	11.30 Ret.	New York, NY	Full exchange privileges on Anteriors & Posteriors Plastic full & broken sets	85% Discount	Unknown
NORDENT	1.70 Trade	Direct only		Heavy Substitution	
Super Dent	6.65 Ret.				
UNIVERSAL					
Premium Porcelain	31.25 Ret.	Montgomeryville, PA	Similar to Dentsply	50% Premium	30days
Univac Polychrome	26.25 Lab.		*Dealer exchange account for returns	68% Medium	1.5% of unpaid balance
Premium Plastic	12.00 Trade		*30% of exchange account to offset YTD purchases (3 to 1)	52% Economy	
Verident Polychrome	Same		*No returns on Block EFP Plastic Teeth	(No return on broken sets)	45days
Medium Plastic	23.95 Ret.		*No returns on Econacryl		2% of unpaid balance
TruForm Ants	4.15 Trade				
Economy Plastic	3.85 Ret.				
Econacryl Ants	1.85 Trade				
DENTSPLY					
Premium Porcelain		York PA	Exchange Account - 50% (2 for 1 purchase)	BB IPN - 45%	60 days
BB Porc	\$32.15/19.65			BF IPN - 40%	1.5% of unpaid balance
BF Porc	25.20/17.64	Network of Nationwide Dealers only	Settlement allowance: Classic - 2%	BB Conv - 38.9%	
Premium Plastic				NH Plas - 35%	
BB IPN	36.15/19.85			Classic - 30%	

Attachment B.3

Attachment B.3: Manufacturer's Characteristics

Manufacturer	Pricing Retail/Lab	Distribution	Return & Exchange Policies	Pricing Discounts	Credit Terms
BF IPN	27.35/17.80		New Hue Plastic - 2%	IPN Posts - 40%	
BB Conv	32.15/19.65		All other items - 12%	All other lines - 30%	
BF Conv	25.20/17.64		% of net purchases credited assuming monthly deadline of the 25th is met		
Medium Plastic					
Biolone Ants	10.25/7.18				
Economy Plastic					
NH Plas Ants	4.10/2.85				
Classic	-/2.85				
VIDENT					
Premium Porcelain		Baldwin Park, CA	Anteriors:	Maximum 45% after cum \$1000 Purchase	30days
Lumin Vac.	31.45/17.30	Dealer/Direct	Full & Broken sets on both	Lab Rate: 27% Porc & Plas Posts	1.5% of unpaid
Medium Plastic		Dealers:	Porcelain & Plastic lines	37% Porc & Plas Ants	balance
Vitapan	28.55/15.70	Regional Labs with Vident consignment	Posteriors	Best Lab Rate: 45% on all teeth	
			Full 1x8 sets only in Porcelain & Plastic	Trade - 55%	
IVOCLAR					
Premium Plastic		Buffalo, NY	Anterior & Posterior full and broken sets	Maximum:	30days
Vivosit	33.10/18.35	Sacramento, CA	are returnable for credit against a new	45% Vivosit	1.5% of unpaid
Premium Plastic		Dealer/Direct	tooth order or future tooth order	35% Vivodent	balance
Vivodent	25.20/16.40	Consignment		After single \$2,000 min	
				Average Trade 55%	
MYERSON/KENSON					
Premium Porcelain		Chicago, IL	Full exchange privileges on complete sets of Anteriors and Posteriors	Discount rate	30days
Myerson/Kenson	21/7.25	Dealer/Direct		Trade	1.5% of unpaid
Porcelain Ant			Broken Sets Surcharge:	Lab	balance
Premium Plastic			Porc Posts - No Returns	My Porc Spec Ant	
Dura Blend Specials	27.00/9.20		Porc Ants - \$.65/tooth	My/Ken Porc Ant	
Medium Plastic			Plastic Ants & Posts	My/Ken Porc Post	
Dura Blend	21.00/6.75		.15/tooth	D-B Spec Ant	
Economy Plastic				Dura Blend Ant	
Kenson Cambridge	20.00/2.80			Dura Blend Post	
(Well known substitute)				Kenson Plas Ant	
				Kenson Plas Post	

SOURCE

Dentsply document DS 027616 - 617. Some American Tooth brand names were not fully legible on source material.

EXHIBIT C-1

Attachment C.1: Dentsply Trubyte Dealer Information and Sales (1995)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Dealer			Exclusive	Tooth				
	Type 4/			Dentsply	Stocking				
Dealer 1/	L	O	M	Dealer	Location	1995		Caulk Division- 1995	
						Sales	% of Total	Purchases	% of Total
PATTERSON DENTAL	X	X			51	\$11,551,599	24.05%		
ZAHN DENTAL CO., INC.	X		X		11	\$10,723,990	22.32%		
H. MEER DENTAL	X	X			5	\$2,427,555	5.05%		
DARBY GROUP	X	X	X		4	\$2,023,959	4.21%		
BENCO DENTAL	X	X			1	\$1,408,575	2.93%		
J B DENTAL	X	X		X	6	\$1,325,318	2.76%		
DTL. LABY DISCOUNT SUPPLY	X		X	X	1	\$1,247,994	2.60%		
HENDON DENTAL SUPPLY	X				1	\$1,156,488	2.41%		
THOMPSON DENTAL	X	X			5	\$1,101,631	2.29%		
ATLANTA DENTAL SUPPLY	X	X			1	\$865,268	1.80%		
BURKHART DENTAL	X	X		X	3	\$641,177	1.33%		
GUGGENHEIM	X	X			1	\$636,903	1.33%		
REEVE DENTAL	X	X			2	\$587,684	1.22%		
ARNOLD DENTAL SUPPLY	X	X			1	\$510,650	1.06%		
PEARSON DENTAL	X	X			4	\$498,145	1.04%		
NOWAK DENTAL SUPPLIES INC.	X	X			1	\$484,583	1.01%		
KENTUCKY	X	X		X	1	\$452,226	0.94%		
HILL DENTAL	X	X			1	\$444,781	0.93%		
NASHVILLE DENTAL INC	X	X			1	\$440,198	0.92%		
IOWA DENTAL SUPPLY CO	X	X			1	\$403,550	0.84%		
DENTAL TECHICIAN SUPPLY	X		X		4	\$402,376	0.84%		
JOHN MARCUS	X	X		X	1	\$379,479	0.79%		
MOHAWK DENTAL	X	X			2	\$363,214	0.76%		
DENTAL SUPPLIES & EQUIP	X	X			1	\$332,837	0.69%		
ACCU BITE DENTAL SUPPLY INC	X	X		X	1	\$316,727	0.66%		
LINCOLN DENTAL	X		X		1	\$299,334	0.62%	\$0	0.00%
SULLIVAN DTL PRODUCTS INC		X			0	\$249,400	0.52%	\$3,689,416	9.47%
MIDWAY DENTAL SUPPLY INC	X	X		X	1	\$217,608	0.45%		
CRUTCHER	X	X			2	\$205,805	0.43%		
RYKER DENTAL CORPORATION	X	X		X	1	\$158,149	0.33%		
LEVENTHAL & SONS	X	X		X	1	\$148,607	0.31%		
JAHN	X	X		X	1	\$139,032	0.29%		
BECKER PARKIN DTL SUPPLY CO	X	X			1	\$124,680	0.26%	\$1,467,650	3.77%
SPOOR	X	X			1	\$119,775	0.25%		
GOETZE NIEMER	X	X		X	1	\$116,899	0.24%		
DENTISTS' SUPPLY CO. OF HI	X	X		X	1	\$65,994	0.14%		
ISLAND DTL SUPPLY CO INC		X			0	\$55,618	0.12%	\$836,920	2.15%
ADIUM DENTAL PRODUCTS INC	X			X	1	\$54,344	0.11%		
ALVY DENTAL SUPPLY CO	X				0	\$31,761	0.07%		
CDS DENTAL SUPPLY INC		X			0	\$31,485	0.07%	\$133,792	0.34%
JMC DENTAL SUPPLY CO	X	X		X	1	\$25,066	0.05%		
JACK MARSH DENTAL		X			0	\$24,072	0.05%	\$203,752	0.52%
OTT DENTAL SUPPLY CO	X	X			0	\$21,988	0.05%	\$58,124	0.15%
JOHNSON & LUND	X	X		X	1	\$21,453	0.04%		
GREAT LAKES ORTHO PROD		X			0	\$18,110	0.04%		
NEWARK DENTAL SUPPLY CORP		X			0	\$17,363	0.04%	\$203,818	0.52%
GLOBAL DTL SUPPLY CO INC	X				0	\$16,829	0.04%		
JACK C SILCOX INC	X	X			0	\$14,154	0.03%		
BARTON-CYKER DENTAL SUPPLY	X	X			0	\$13,552	0.03%	\$245,775	0.63%
KEANE DENTAL SUPPLY	X	X			0	\$11,128	0.02%		
PARKWAY DENTAL SERVICES		X			0	\$7,833	0.02%	\$116,005	0.30%
MOUNTAIN WEST DTL COMPANY		X			0	\$6,991	0.01%	\$265,436	0.68%
VALLEY DENTAL SUPPLY INC		X			0	\$5,499	0.01%	\$60,591	0.16%
QUALITY DISCOUNT DENTAL		X			0	\$4,175	0.01%	\$22,935	0.06%
WILLIAMS DENTAL SUPPLY CO		X			0	\$3,494	0.01%	\$36,954	0.09%
SATURN DENTAL 1/	X						0.00%		
TOTAL TRUBYTE SALES 2/						\$48,038,168			
TOTAL CAULK SALES 3/								\$38,951,994	

SOURCES

Column (1): Exhibit E (Tooth & Merchandise Dealers and Merchandise Only Dealers) of Dentsply Report to DOJ, 4/18/97.

Columns (2) & (3): Exhibit E (Tooth & Merchandise Dealers and Merchandise Only Dealers) of Dentsply Report to DOJ, 4/18/97.

Column (4): C.T. Clark Deposition (December 14 & 15, 1999) Exhibit 21 (DS 015927); C. Clark 8/21/96 pp 32-50.

Columns (5), (6) & (7): DPLY 002439-40.

Column (8): Percent of total sales as reported in DPLY 002439-40.

Column (9) & (10): Exhibit titled "Trubyte Merchandise Dealer Purchases of Caulk Division Products-1995" of Dentsply Report to DOJ, 4/18/97.

Attachment C.1

1 / 3

Attachment C.1: Dentsply Trubyte Dealer Information and Sales (1995)**NOTES**

1/ Dentsply lists the following additional dealers for 1995 in document DPLY 002439-40 "Descending Customer Sales, Dentsply Trubyte Division"

Dealer	Exclusive	Tooth Loc.	Sales
BARBER	X	1	\$388,610
BENTON DENTAL		1	\$105,329
CAPITAL DENTAL SUPPLY INC	X	1	\$208,632
DENTAL SERVICE CO INC	X	1	\$427,033
DIRECT DENTAL		0	\$657
DIXIE		1	\$180,314
FM		0	\$7,618
FRINK DENTAL	X	1	\$443,542
McGRATH CO	X	1	\$300,435
ROBIN DENTAL COMPANY INC		1	\$235,756
SMITH HOLDEN INC		0	\$40,666
TECHNICAL DENTAL SUPPLIES		0	\$2,066
THAU NOLDE	X	1	\$646,296

In addition, in DPLY 002439-40, Dentsply indicates that Becker-Parkin and Lincoln each have 1 "Tooth Stocking Location" but in Exhibit E they indicate that they are "Merchandise Only Dealers." Saturn Dental appears as a "Merchandise Only Dealer" in Exhibit E but does not appear in DPLY 002439-40.

2/ Total is "Grand Total" reported in DPLY 002439-40 and includes dealers listed in note 1 above and government and school sales.

3/ Total is "Total Caulk" as reported in Dentsply Report to DOJ, 4/18/97.

4/ L=laboratory dealer; O=operator dealer; M=mail order/hybrid dealer.

Attachment C.1: Other Manufacturers' Products Carried by Trubyte Dealers

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Dealer			Dentsply				Austenal	
	Type 1/			Exclusive				Myerson	American
Dealer	L	O	M	Dealer	Ivoclar	Vita	Universal	Kenson	Tooth
PATTERSON DENTAL	X	X					X		
ZAHN DENTAL CO., INC.	X		X				X		
H. MEER DENTAL	X	X					X		
DARBY GROUP	X	X	X						
BENCO DENTAL	X	X					X		X
J B DENTAL	X	X		X					
DTL LABY DISCOUNT SUPPLY	X		X	X					
HENDON DENTAL SUPPLY	X						X		
THOMPSON DENTAL	X	X					X		
ATLANTA DENTAL SUPPLY	X	X					X	X	X
BURKHART DENTAL	X	X		X					
GUGGENHEIM	X	X						X	
REEVE DENTAL	X	X					X		
ARNOLD DENTAL SUPPLY	X	X					X		
PEARSON DENTAL	X	X					X		
NOWAK DENTAL SUPPLIES INC. 2/	X	X					X		
KENTUCKY	X	X		X					
HILL DENTAL	X	X					X		
NASHVILLE DENTAL INC	X	X							
IOWA DENTAL SUPPLY CO	X	X					X		
DENTAL TECHICIAN SUPPLY	X		X			X			
JOHN MARCUS	X	X		X					
MOHAWK DENTAL	X	X					X		
DENTAL SUPPLIES & EQUIP	X	X					X		
ACCU BITE DENTAL SUPPLY INC	X	X		X					
LINCOLN DENTAL	X		X						
SULLIVAN DTL PRODUCTS INC		X							
MIDWAY DENTAL SUPPLY INC	X	X		X			X		
CRUTCHER	X	X							
RYKER DENTAL CORPORATION	X	X		X					
LEVENTHAL & SONS	X	X		X					
JAHN	X	X		X			X		
BECKER PARKIN DTL SUPPLY CO	X	X							
SPOOR	X	X					X		
GOETZE NIEMER	X	X		X			X		
THE DENTISTS' SUPPLY CO. OF HI	X	X		X					
ISLAND DTL SUPPLY CO INC		X							
ADIUM DENTAL PRODUCTS INC	X			X					
ALVY DENTAL SUPPLY CO	X						X		
CDS DENTAL SUPPLY INC		X							
JMC DENTAL SUPPLY CO	X	X		X			X		
JACK MARSH DENTAL		X							
OTT DENTAL SUPPLY CO	X	X				X	X		X
JOHNSON & LUND	X	X		X					
GREAT LAKES ORTHO PROD		X							
NEWARK DENTAL SUPPLY CORP		X							
GLOBAL DTL SUPPLY CO INC	X								
JACK C SILCOX INC	X	X							
BARTON-CYKER DENTAL SUPPLY INC	X	X							
KEANE DENTAL SUPPLY	X	X							
PARKWAY DENTAL SERVICES		X							
MOUNTAIN WEST DTL COMPANY		X							
VALLEY DENTAL SUPPLY INC		X							
QUALITY DISCOUNT DENTAL		X							
WILLIAMS DENTAL SUPPLY CO		X						X	
SATURN DENTAL	X								

SOURCES

Column (1): Exhibit E (Tooth & Merchandise Dealers and Merchandise Only Dealers) of Dentsply Report to DOJ, 4/18/97.
Columns (2) & (3): Exhibit E (Tooth & Merchandise Dealers and Merchandise Only Dealers) of Dentsply Report to DOJ, 4/18/97.
Column (4): C.T. Clark Deposition (December 14 & 15, 1999) Exhibit 21 (DS 015927); C. Clark 8/21/96 pp. 32-50.
Column (5): DPLY-A 002439-40.
Column (6): "Ivoclar currently has no dealers selling denture teeth in the United States." (DOJ Appendix, p88)
Column (7): Vitapan dealer list (VITA-00113X).
Column (8): Dealers carrying Universal teeth are taken from Universal's customer sales information for the year 1995 (A5-0003 - A5-0004)
Column (9): Dealer interviews indicate Austenal/Myerson/Kenson teeth carried by Atlanta, Guggenheim, and Williams (DOJ Appendix, p6, p27, and p58).
Column (10): Source indicating teeth sold by Benco and Atlanta: manufacturer interview (DOJ Appendix, p65) and dealer interview (DOJ Appendix, p6), respectively. Ott also claims that it sells American (DOJ Appendix, p40).

NOTES

1/ L=laboratory dealer; O=operator dealer; M=mail order/hybrid dealer.
2/ Nowak Dental: Reportedly no longer in business (DOJ Appendix, p102).

EXHIBIT C-2a

Attachment C.2a: Dentsply Trubyte Merchandise Only Dealers

<u>Dealer</u>	<u>Lab or Operatory Dealer 1/</u>
Alvy Dental	L
Barton-Cyker Dental	L & O
Becker-Parkin	L & O
CDS Dental	O
Global Dental Supply Co.	L
Great Lakes Orthodontics	O
Island Dental	O
Jack Marsh	O
Jack Silcox	L & O
Keane Dental Supply	L & O
Lincoln Dental	L
Mountain West	O
Newark Dental	O
Ott Dental	L & O
Parkway Dental	O
Quality Discount Dental	O
Saturn Dental	L
Sullivan Dental	O
Valley Dental	O
Williams Dental	O

SOURCE

Exhibit E (Tooth & Merchandise Dealers and Merchandise Only Dealers) of Dentsply Report to DOJ, 4/18/97.

NOTES

1/ L=laboratory dealer; O=operatory dealer.

EXHIBIT C-2b

Attachment C.2b: Non-Trubyte Dealers Selling to Dental Labs

<i>Dealer</i>	
Dart Dental Supply	Hamden, CT
Zuckerman Dental Supply	Taunton, MA
Servatab	Paramus, NJ
Conger Dental	Topeka, KS
Bee Bee's Hive	Miami, FL
Dental Express	Kennesaw, GA
Summit Dental	Salem, VA
Dental Distributors	St. Petersburg, FL
Continental Dental	Phoenix, AZ
Trinity	Geneva, IL
Davis Dental Supply	N. Hollywood, CA
Southern Dental Supply	Valdosta, GA
Northwest Dental Supply	Post Falls, ID
Sun Dental	Honolulu, HI
Ami Dental	Houston, TX
Americana Dental	Covington, KY
Popp Dental Supply	Greendale, WI
Witt Dental	Nicholasville, KY
Northwest Dental Supply	Post Falls, ID
Gem State Dental	Boise, ID
Barr Dental	Medford, OR
Davis Dental Supply	North Hollywood, CA
L&M Dental Supply	Denver, CO
Barrego-Biomedical	El Paso, TX
Medi-Dental	Laredo, TX
AM Dental Supply	Houston, TX
Brownsville Dental Supply	Brownsville, TX
Tri-City Dental	Orange, TX
Harris Dental Supply	Dallas, TX
Functional Esthetics Laboratory	
DiMartino Laboratory	Seattle, WA
Thomas Dental Supply	Oklahoma City, OK
Midwest Dental Supply	Wichita Falls, TX

SOURCE

Exhibit titled "Non-Trubyte Dealers Selling to Dental Labs" of Dentsply Report to DOJ, 4/18/97.

EXHIBIT C-3a

B - 97

Attachment C.3a: Trubyte Merchandise Dealers Only

Barton-Cyker, Windsor, CT

- Does not distribute teeth. Sells non-teeth merchandise primarily to dentists (DOJ Appendix p.8).

Becker-Parkin, New York, New York

- Sells everything dentists need except teeth (DOJ Appendix p.9), including merchandise from Dentsply, Ivoclar and Vita, as well as toothbrushes from Lactona (Universal) (DOJ Appendix p.10).
- Becker-Parkin does most of its business with Dentsply divisions other than Trubyte (DOJ Appendix p.10). With the exception of 12 small labs, B-P does not sell to laboratories (DOJ Appendix p.9).

CDS Dental, Anaheim, CA

- "CDS does not sell artificial teeth." (DOJ Appendix p.11)

Island Dental Supply, Hauppauge, NY

- Island has not sold teeth since the late 1970's (DOJ Appendix p.29).

Jack Marsh Dental, Hackensack, NJ

- "Marsh does not sell artificial teeth and has no current plans to do so." (DOJ Appendix p.39)

Lincoln Dental, Cherry Hill, NJ

- Does not sell any teeth but its own line manufactured in Columbia by Newsthetics. (DOJ Appendix p.33) Does not like selling teeth and annual sales of teeth only around \$1million (DOJ Appendix p.35) of total annual sales (including other dental merchandise) of \$6-7 million (DOJ Appendix p.33).
- Concerned about possibility of Dentsply threatening to pull Lucitone unless Lincoln drops its new Super-C line of teeth comparable to Dentsply's mid-line. Without Lucitone would lose many customers. Even worse if Dentsply threatened to remove all Trubyte products including non-teeth merchandise unless Lincoln dropped its new Super-C line; "Lincoln would sue them but might temporarily refrain from selling its new line." (DOJ Appendix p.36.)

Ott Dental Supply, Pittsburgh, PA

- ODS bought out another dealership in 1994 that carried Dentsply, but Dentsply wouldn't let them continue to distribute unless gave up Vident teeth. ODS decided not to go with Dentsply, in part because thinks Vident's teeth are better quality – shades and longevity (DOJ Appendix pp.40-41).
- "Dentsply has not threatened to withdraw its merchandise line from ODS. If it ever did upon the condition that ODS drop its Vident line of teeth, ODS would have to let Vident go if Dentsply threatened to pull its composites or drills." (DOJ Appendix p.43.)

Attachment C.3a: Trubyte Merchandise Dealers Only

Parkway Dental, Pennsauken, NJ

- Does not distribute teeth but sells other dental merchandise (including that of Trubyte) to dentists almost exclusively. (DOJ Appendix p.45 and Interrogatory Response Ex. 9B.)

Sullivan Dental, WI

- Does not sell teeth at all because is too labor intensive, has low profit margins, and the market is only decreasing over time. Deals primarily with dentists. (DOJ Appendix p.48.)

Valley Dental, Burbank, CA

- Has not sold artificial teeth since the 1960's (DOJ Appendix p.56).

Williams Dental Supply, Worcester, MA

- Sells only Myerson teeth and has no intention of expanding into premium tooth business (DOJ Appendix p.58).

EXHIBIT C-3b

Attachment C.3b: Non-Trubyte Dealers Selling to Dental Labs

Americana Dental (Covington, KY)

- Listed in DOJ Laboratory appendix (p.129).

Davis Dental Supply (N.Hollywood, CA)

- Refused by Dentsply as a dealer because too small, then later because refused to drop Universal, then again refused even with Universal drop. Has resorted to buying Dentsply at retail in order not to lose certain customers. (DOJ Appendix pp.16-17.)

Dental Express

- Listed in DOJ Laboratory appendix (p.139).

DiMartino Laboratory (Seattle, WA)

- Listed in DOJ Laboratory appendix (pp.144-146).

Functional Esthetics Laboratory

- Listed in DOJ Laboratory appendix (pp.149-152).

Midwest Dental Supply (Wichita Falls, TX)

- Does not sell teeth (DOJ Appendix pp. 39-40).

Popp Dental Supply (Greendale, WI)

- This dealer does not carry teeth (DOJ Appendix p.47).

Summit Dental (Salem, VA)

- Does not sell teeth (DOJ Appendix p49).

Sun Dental (Honolulu, HI)

- Listed in DOJ Laboratory appendix (p.192).

Trinity (Geneva, IL)

- Late 1992 another nearby dealer converted to Dentsply (Jan Dental) and had to give up its Vita teeth. Trinity then was able to pick up the Vident line in early 1993 with a consignment order.
- Shortly after picking up the Vident tooth line, Trinity was terminated as a distributor of Dentsply non-teeth merchandise altogether (April 14, 1993). Trinity was unprepared for this since it met the documented Dentsply supplier criteria (carrying the minimum dollar volume of Dentsply products). Trinity believes they could have sold other teeth besides Vita and not had any problem with Dentsply. (DOJ Appendix p.53.)

Zuckerman Dental Supply (Taunton, MA)

- Listed in DOJ Laboratory appendix (p.197).

EXHIBIT C-4

B - 102

Attachment C.4 Foreclosure Analysis

	SCENARIO I	SCENARIO II *
DEALER OUTLETS AVAILABLE FOR TOOTH DISTRIBUTION		
Dentsply Trubyte Dealer Outlets 1/	134	134
Non-Trubyte Dealers Outlets 2/	27	27
Additional Vident Dealers Not on Dentsply List of Dealers 3/	3	3
Additional Vident Dealer (Lab-Dent) 4/	1	1
Additional Universal Dealers Not On Dentsply List of Dealers 5/	10	0
Total dealer outlets available for tooth distribution	175	165
 DEALER OUTLETS CONTROLLED BY DENTSPLY 1/	 134	 134
 OUTLETS FORECLOSED 6/	 77%	 81%

SOURCES

1/ Dentsply documents DPLY 002439 -2440.

2/ "Non-Trubyte Dealers Selling to Dental Labs" in Dentsply Report to DOJ, 4/18/97. Dentsply lists 33 dealers; however 6 of those are listed in the DOJ Laboratory Appendix as laboratories and not dealers (16. Americana Dental, Covington, KY (p. 129); 6. Dental Express (p. 139); 31. DiMartino Laboratory (p. 144); 30. Functional Esthetics Laboratory (p. 149); 14. Sun Dental (p. 192); 2. Zuckerman Dental Supply (p. 197)). I assume each remaining dealer has only one outlet.

3/ Vident dealer list (VITA-00113X) identified 17 dealers; all but 3 were either on Dentsply lists or were laboratory dealers. I assume each remaining dealer has only one outlet.

4/ Advice of Counsel.

5/ Universal documents A5-0003 - 0004. All but 10 of those listed were eliminated because they appear on Dentsply lists. I assume each of these remaining ten dealers has only one outlet.

6/ Dealer outlets controlled by Dentsply divided by total dealer outlets available for tooth distribution.

NOTES

Based on current information, I assume all American/Justi dealer outlets are either Trubyte dealers or operator dealers.

* Under Scenario II, I assume all remaining Universal outlets have been excluded (see note 5 above).

EXHIBIT D-1

B - 104

Table D.1: US Teeth Market Shares

Segment	Company (1)	1987 (2)	1988 (3)	1989 (4)	1990 (5)	1991 (6)	1992 (7)	1993 (8)	1994 (8)	1995 (8)
Porcelain	Dentsply	75.0%	82.5%	90.0%	90.5%	91.0%	91.0%	91.0%	91.0%	91.0%
	Ivoclar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Universal	15.0%	8.5%	2.0%	3.0%	4.0%	4.0%	4.0%	4.0%	4.0%
	Myerson/Austenal/Kenson (pre 1997)	5.0%	3.5%	2.0%	1.5%	1.0%	4.0%	4.0%	4.0%	4.0%
	Swissdent (pre 1997)	1.0%	3.0%	5.0%	4.5%	4.0%	1.0%	1.0%	1.0%	1.0%
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	American Tooth/Justi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dentorium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Vita/Vident	2.0%	1.5%	1.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%
	Other	2.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Premium	HHI	5884	6903	8134	8222	8314	8314	8314	8314	8314
	Dentsply	75.0%	77.5%	80.0%	84.5%	89.0%	89.0%	89.0%	89.0%	89.0%
	Ivoclar	3.0%	5.5%	8.0%	5.5%	3.0%	3.0%	3.0%	3.0%	3.0%
	Universal	8.0%	5.5%	3.0%	1.5%	0.0%	2.0%	2.0%	2.0%	2.0%
	Myerson/Austenal/Kenson (pre 1997)	3.0%	2.0%	1.0%	0.5%	0.0%	2.0%	2.0%	2.0%	2.0%
	Swissdent (pre 1997)	1.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	American Tooth/Justi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dentorium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Vita/Vident	6.0%	7.0%	8.0%	6.0%	4.0%	4.0%	4.0%	4.0%	4.0%
	Other	4.0%	2.0%	0.0%	2.0%	4.0%	0.0%	0.0%	0.0%	0.0%
Medium	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
	HHI	5760	6124	6538	7213	7962	7954	7954	7954	7954
	Dentsply	65.0%	66.0%	67.0%	66.5%	66.0%	65.0%	65.0%	65.0%	65.0%
	Ivoclar	0.0%	0.0%	0.0%	1.5%	3.0%	4.0%	4.0%	4.0%	4.0%
	Universal	20.0%	17.0%	14.0%	10.0%	6.0%	5.0%	5.0%	5.0%	5.0%
	Myerson/Austenal/Kenson (pre 1997)	2.0%	6.5%	11.0%	7.5%	4.0%	3.0%	3.0%	3.0%	3.0%
	Swissdent (pre 1997)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	American Tooth/Justi	5.0%	6.5%	8.0%	14.0%	20.0%	22.0%	22.0%	22.0%	22.0%
	Dentorium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Vita/Vident	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Economy	Other	8.0%	4.0%	0.0%	0.5%	1.0%	1.0%	1.0%	1.0%	1.0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
	HHI	4718	4746	4870	4777	4818	4760	4760	4760	4760
	Dentsply	25.0%	40.0%	55.0%	53.0%	51.0%	52.0%	52.0%	52.0%	52.0%
	Ivoclar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Universal	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Myerson/Austenal/Kenson (pre 1997)	25.0%	23.0%	21.0%	15.5%	10.0%	9.0%	9.0%	9.0%	9.0%
	Swissdent (pre 1997)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	American Tooth/Justi/Dymon Hue/Regal	0.0%	0.0%	0.0%	5.0%	10.0%	9.0%	9.0%	9.0%	9.0%
	Dentorium	0.0%	0.0%	0.0%	4.0%	8.0%	7.0%	7.0%	7.0%	7.0%
Total	Vita/Vident	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Other	50.0%	37.0%	24.0%	22.5%	21.0%	23.0%	23.0%	23.0%	23.0%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
	HHI	3750	3498	4042	3597	3306	3444	3444	3444	3444
	Dentsply	62.1%	69.5%	76.9%	76.4%	79.9%	80.0%	80.0%	80.0%	80.0%
	Ivoclar	1.4%	3.0%	4.7%	3.4%	2.1%	2.2%	2.2%	2.2%	2.2%
	Universal	9.0%	6.4%	3.7%	2.4%	1.0%	2.0%	2.0%	2.0%	2.0%
	Myerson/Austenal/Kenson (pre 1997)	8.3%	6.6%	5.0%	3.7%	2.4%	3.7%	3.7%	3.7%	3.7%
	Swissdent (pre 1997)	0.6%	0.7%	0.8%	0.7%	0.5%	0.1%	0.1%	0.1%	0.1%
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	American Tooth/Justi/Dymon Hue/Regal	0.7%	0.8%	0.9%	2.3%	3.6%	3.5%	3.5%	3.5%	3.5%
Total	Dentorium	0.0%	0.0%	0.0%	0.8%	1.6%	1.4%	1.4%	1.4%	1.4%
	Vita/Vident	3.1%	4.0%	4.8%	3.6%	2.4%	2.5%	2.5%	2.5%	2.5%
	Other	14.9%	9.0%	3.2%	4.9%	6.6%	4.7%	4.7%	4.7%	4.7%
	Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
	HHI	4233	5016	6002	6213	6453	6465	6465	6465	6465

Notes: (1) Company groupings are based on information found in the Manufacturers section of the Appendix to United States' Response to Dentsply's First Interrogatory.

(2) Source: DS 029729 - DS 029732.

(3) Calculated by taking the average of 1987 and 1989 market shares.

(4) Source: DS 029708 - DS 029711.

(5) Calculated by taking the average of 1989 and 1991 market shares.

(6) Source: DS 056683 - DS 056690.

(7) Source: DS 056658 - DS 056662.

(8) 1992 market shares were used for 1993 through 1999.

Table D.1: US Teeth Market Shares

Segment	Company (1)	1996 (8)	1997 (8)	1998 (8)	1999 (8)
Porcelain	Dentsply	91.0%	91.0%	91.0%	91.0%
	Ivoclar	0.0%	0.0%	0.0%	0.0%
	Universal	4.0%	4.0%	4.0%	4.0%
	Myerson/Austenal/Kenson (pre 1997)	4.0%	n/a	n/a	n/a
	Swissdent (pre 1997)	1.0%	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	5.0%	5.0%	5.0%
	American Tooth/Justi	0.0%	0.0%	0.0%	0.0%
	Dentorium	0.0%	0.0%	0.0%	0.0%
	Vita/Vident	0.0%	0.0%	0.0%	0.0%
	Other	0.0%	0.0%	0.0%	0.0%
	Total	100%	100%	100%	100%
Premium	HHI	8314	8322	8322	8322
	Dentsply	89.0%	89.0%	89.0%	89.0%
	Ivoclar	3.0%	3.0%	3.0%	3.0%
	Universal	2.0%	2.0%	2.0%	2.0%
	Myerson/Austenal/Kenson (pre 1997)	2.0%	n/a	n/a	n/a
	Swissdent (pre 1997)	0.0%	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	2.0%	2.0%	2.0%
	American Tooth/Justi	0.0%	0.0%	0.0%	0.0%
	Dentorium	0.0%	0.0%	0.0%	0.0%
	Vita/Vident	4.0%	4.0%	4.0%	4.0%
	Other	0.0%	0.0%	0.0%	0.0%
Medium	Total	100%	100%	100%	100%
	HHI	7954	7954	7954	7954
	Dentsply	65.0%	65.0%	65.0%	65.0%
	Ivoclar	4.0%	4.0%	4.0%	4.0%
	Universal	5.0%	5.0%	5.0%	5.0%
	Myerson/Austenal/Kenson (pre 1997)	3.0%	n/a	n/a	n/a
	Swissdent (pre 1997)	0.0%	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	3.0%	3.0%	3.0%
	American Tooth/Justi	22.0%	22.0%	22.0%	22.0%
	Dentorium	0.0%	0.0%	0.0%	0.0%
	Vita/Vident	0.0%	0.0%	0.0%	0.0%
Economy	Other	1.0%	1.0%	1.0%	1.0%
	Total	100%	100%	100%	100%
	HHI	4760	4760	4760	4760
	Dentsply	52.0%	52.0%	52.0%	52.0%
	Ivoclar	0.0%	0.0%	0.0%	0.0%
	Universal	0.0%	0.0%	0.0%	0.0%
	Myerson/Austenal/Kenson (pre 1997)	9.0%	n/a	n/a	n/a
	Swissdent (pre 1997)	0.0%	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	9.0%	9.0%	9.0%
	American Tooth/Justi/Dymon Hue/Regal	9.0%	9.0%	9.0%	9.0%
	Dentorium	7.0%	7.0%	7.0%	7.0%
Total	Vita/Vident	0.0%	0.0%	0.0%	0.0%
	Other	23.0%	23.0%	23.0%	23.0%
	Total	100%	100%	100%	100%
	HHI	3444	3444	3444	3444
	Dentsply	80.0%	80.0%	80.0%	80.0%
	Ivoclar	2.2%	2.2%	2.2%	2.2%
	Universal	2.0%	2.0%	2.0%	2.0%
	Myerson/Austenal/Kenson (pre 1997)	3.7%	n/a	n/a	n/a
	Swissdent (pre 1997)	0.1%	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissdent (1997 on)	n/a	3.8%	3.8%	3.8%
	American Tooth/Justi/Dymon Hue/Regal	3.5%	3.5%	3.5%	3.5%
	Dentorium	1.4%	1.4%	1.4%	1.4%
Total	Vita/Vident	2.5%	2.5%	2.5%	2.5%
	Other	4.7%	4.7%	4.7%	4.7%
	Total	100%	100%	100%	100%
HHI		6465	6465	6465	6465

EXHIBIT D-2a

B - 107

Table D.2A: Total Dentistry Sales and Total Teeth Market

Year	Sales Units (000's)	Trade Sales \$ (1)	Lab Sales \$ (\$000) (2)	Dentistry Market Share (3)	Total Lab Market (000's) (4)
1987	36,356	28,365	39,862	62.1%	64,239
1988	36,285	29,128	40,943	69.5%	58,950
1989	35,480	30,179	42,424	76.9%	55,199
1990	39,203	33,205	46,711	78.4%	59,615
1991	39,627	33,987	47,832	79.9%	59,900
1992	40,883	33,401	47,042	80.0%	58,801
1993	38,237	39,908	56,177	80.0%	70,221
1994	7	38,627	54,403	80.0%	68,002
1995	36,104	40,144	56,539	80.0%	70,673
1996	34,136	38,982	54,908	80.0%	68,634
1997	35,447	45,418	57,936	80.0%	72,419
1998	34,899	43,734	61,580	80.0%	76,974
1999	30,957	39,106	55,070	80.0%	68,836
1987 - 1999 Totals	437,614	474,184	661,427		852,462

Notes:

- (1) 1987 Source: DPLY-A-021909 - DPLY-A-021917 (1992 Dentistry Tooth Marketing Plan). Assumed to be gross sales.
- 1988 Source: DPLY-A-021909 - DPLY-A-021917 (1992 Dentistry Tooth Marketing Plan). Assumed to be gross sales.
- 1989 Source: DPLY-A-021909 - DPLY-A-021917 (1992 Dentistry Tooth Marketing Plan). Assumed to be gross sales.
- 1990 Source: DPLY-A-021909 - DPLY-A-021917 (1992 Dentistry Tooth Marketing Plan). Assumed to be gross sales.
- 1991 Source: Dentistry forecasted sales from DPLY-A-021909 - DPLY-A-021917 (1992 Dentistry Tooth Marketing Plan). Assumed to be gross sales.
- 1992 Source: Dentistry forecasted sales from DPLY-A-021909 - DPLY-A-021917 (1992 Dentistry Tooth Marketing Plan). Assumed to be gross sales.
- 1993 Source: DS 009886 - DS 009890. Assumed to be gross sales.
- 1994 Source: Gross sales from DS 068304 (Dentistry Trade Financial Statement).
- 1995 Source: Gross sales from Dentistry's Objections and Responses to Plaintiff's First Set of Interrogatories in Howard Hess et al. v. Dentistry, Jan 21, 2000, Exhibit I.
- 1996 Source: Gross sales from Dentistry's Objections and Responses to Plaintiff's First Set of Interrogatories in Howard Hess et al. v. Dentistry, Jan 21, 2000, Exhibit I.
- 1997 Source: Gross sales from Dentistry's Objections and Responses to Plaintiff's First Set of Interrogatories in Howard Hess et al. v. Dentistry, Jan 21, 2000, Exhibit I.
- 1998 Source: Gross sales from Dentistry's Objections and Responses to Plaintiff's First Set of Interrogatories in Howard Hess et al. v. Dentistry, Jan 21, 2000, Exhibit I.
- 1999 Source: April 1999 YTD figures were multiplied by 3 to obtain an estimate for the entire year.
- (2) Lab Sales were calculated by increasing Trade Sales by a 46% markup for Economy teeth and a 40% markup for all other teeth.
- (3) The markups are based on an average obtained from a series of trade and lab price lists.
- (4) From Table D.1.
- (5) Calculated by dividing Lab Sales \$ by Dentistry Market Share.

EXHIBIT D-2b

A-98

Table D.2B: Total Company Sales (1)

Year	Dentsply	Ivoclar	Universal	Myerson / Austenal / Kenson (pre 1997)	Swissdent (pre 1997)	Myerson / Austenal / Kenson / Swissdent (1997 forward)	American Tooth / Just / Dymon Hue / Regal	Dentorium	Vita/Vident	Other	Total
1987	39,862	893	5,761	5,328	406	n/a	440	0	2,002	9,548	64,239
1988	40,943	1,781	3,746	3,914	434	n/a	481	0	2,339	5,312	58,950
1989	42,424	2,568	2,064	2,751	465	n/a	523	0	2,661	1,743	55,199
1990	46,711	1,989	1,406	2,206	392	n/a	1,366	468	2,154	2,912	59,615
1991	47,832	1,231	585	1,447	284	n/a	2,178	941	1,441	3,961	59,900
1992	47,042	1,280	1,191	2,160	59	n/a	2,030	822	1,471	2,746	58,801
1993	56,177	1,529	1,422	2,579	70	n/a	2,425	982	1,757	3,280	70,221
1994	54,403	1,480	1,377	2,498	68	n/a	2,348	951	1,701	3,176	68,002
1995	56,539	1,539	1,431	2,596	70	n/a	2,440	988	1,768	3,301	70,673
1996	54,908	1,494	1,390	2,521	68	n/a	2,370	960	1,717	3,206	68,634
1997	57,936	1,577	1,467	n/a	n/a	2,732	2,501	1,013	1,812	3,382	72,419
1998	61,580	1,676	1,559	n/a	n/a	2,904	2,658	1,077	1,926	3,595	76,974
1999	55,070	1,489	1,394	n/a	n/a	2,597	2,377	963	1,722	3,215	68,836

Notes:

(1) Company groupings are based on information found in the Manufacturers section of the Appendix to United States' Response to Dentsply's First Interrogatory. Sales figures are calculated by multiplying market shares from Table D.1 by the Total Market Sales column from Table D.2A.

EXHIBIT D-3

Table D.3: US Teeth Market Sales (in \$000)

Segment	Company (1)	1987	1988	1989	1990	1991
Porcelain	Dentsply	8,928	8,112	6,728	6,485	5,670
	Ivoclar	-	-	-	-	-
	Universal	1,786	836	150	215	249
	Myerson/Austenal/Kenson (pre 1997)	595	344	150	107	62
	Swissedent (pre 1997)	119	295	374	322	249
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a	n/a
	AM Tooth/Justi	-	-	-	-	-
	Dentorium	-	-	-	-	-
	Vita/Vident	238	147	75	36	-
	Other	238	98	-	-	-
	Total	11,904	9,832	7,476	7,166	6,231
Premium	Dentsply	8,364	10,080	13,238	17,839	21,543
	Ivoclar	335	715	1,324	1,161	726
	Universal	892	715	496	317	-
	Myerson/Austenal/Kenson (pre 1997)	335	260	165	106	-
	Swissedent (pre 1997)	112	65	-	-	-
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a	n/a
	AM Tooth/Justi	-	-	-	-	-
	Dentorium	-	-	-	-	-
	Vita/Vident	669	910	1,324	1,267	968
	Other	446	260	-	422	968
	Total	11,151	13,006	16,548	21,111	24,206
Medium	Dentsply	18,896	18,771	18,246	16,930	14,529
	Ivoclar	-	-	-	382	660
	Universal	5,814	4,835	3,813	2,546	1,321
	Myerson/Austenal/Kenson (pre 1997)	581	1,849	2,996	1,909	881
	Swissedent (pre 1997)	-	-	-	-	-
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a	n/a
	AM Tooth/Justi	1,454	1,849	2,179	3,564	4,403
	Dentorium	-	-	-	-	-
	Vita/Vident	-	-	-	-	-
	Other	2,326	1,138	-	127	220
	Total	29,070	28,441	27,233	25,459	22,014
Economy	Dentsply	3,675	3,980	4,211	5,457	6,090
	Ivoclar	-	-	-	-	-
	Universal	-	-	-	-	-
	Myerson/Austenal/Kenson (pre 1997)	3,675	2,288	1,608	1,596	1,194
	Swissedent (pre 1997)	-	-	-	-	-
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a	n/a
	AM Tooth/Justi/Dymon Hue/Regal	-	-	-	515	1,194
	Dentorium	-	-	-	412	955
	Vita/Vident	-	-	-	-	-
	Other	7,350	3,681	1,837	2,317	2,508
	Total	14,699	9,950	7,656	10,297	11,941
Total (2)	Dentsply	39,862	40,943	42,424	46,711	47,832
	Ivoclar	893	1,781	2,568	1,999	1,231
	Universal	5,761	3,746	2,064	1,406	585
	Myerson/Austenal/Kenson (pre 1997)	5,328	3,914	2,751	2,206	1,447
	Swissedent (pre 1997)	406	434	465	392	284
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a	n/a
	AM Tooth/Justi/Dymon Hue/Regal	440	481	523	1,366	2,178
	Dentorium	-	-	-	468	941
	Vita/Vident	2,002	2,339	2,661	2,154	1,441
	Other	9,548	5,312	1,743	2,912	3,961
	Total	64,239	58,950	55,199	59,615	59,900

Notes: (1) Company groupings are based on information found in the Manufacturers section of the Appendix to United States' Response to Dentsply's First Interrogatory.
Sales figures are calculated by multiplying market shares from Table D.1 by the Total Market Sales column from Table D.2A.

(2) Totals for each tooth segment do not sum to the total market due to rounding error and approximation.

Table D.3: US Teeth Market Sales (in \$000)

Segment	Company (1)	1992	1993	1994	1995
Porcelain	Dentsply	4,833	6,551	5,627	4,924
	Ivoclar	-	-	-	-
	Universal	212	288	247	216
	Myerson/Austen/Kenson (pre 1997)	212	288	247	216
	Swissedent (pre 1997)	53	72	62	54
	Myerson/Austen/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a
	AM Tooth/Justi	-	-	-	-
	Dentorium	-	-	-	-
	Vita/Vident	-	-	-	-
	Other	-	-	-	-
	Total	5,311	7,199	6,183	5,411
Premium	Dentsply	24,244	32,767	34,820	38,640
	Ivoclar	817	1,104	1,174	1,302
	Universal	545	736	782	868
	Myerson/Austen/Kenson (pre 1997)	545	736	782	868
	Swissedent (pre 1997)	-	-	-	-
	Myerson/Austen/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a
	AM Tooth/Justi	-	-	-	-
	Dentorium	-	-	-	-
	Vita/Vident	1,090	1,473	1,565	1,737
	Other	-	-	-	-
	Total	27,240	36,816	39,123	43,416
Medium	Dentsply	11,143	9,399	6,056	4,764
	Ivoclar	686	578	373	293
	Universal	857	723	466	366
	Myerson/Austen/Kenson (pre 1997)	514	434	279	220
	Swissedent (pre 1997)	-	-	-	-
	Myerson/Austen/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a
	AM Tooth/Justi	3,771	3,181	2,050	1,612
	Dentorium	-	-	-	-
	Vita/Vident	-	-	-	-
	Other	171	145	93	73
	Total	17,142	14,460	9,316	7,328
Economy	Dentsply	6,823	7,460	7,901	8,211
	Ivoclar	-	-	-	-
	Universal	-	-	-	-
	Myerson/Austen/Kenson (pre 1997)	1,181	1,291	1,367	1,421
	Swissedent (pre 1997)	-	-	-	-
	Myerson/Austen/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a
	AM Tooth/Justi/Dymon Hue/Regal	1,181	1,291	1,367	1,421
	Dentorium	918	1,004	1,064	1,105
	Vita/Vident	-	-	-	-
	Other	3,018	3,300	3,495	3,632
	Total	13,120	14,347	15,194	15,790
Total (2)	Dentsply	47,042	56,177	54,403	56,539
	Ivoclar	1,280	1,529	1,480	1,539
	Universal	1,191	1,422	1,377	1,431
	Myerson/Austen/Kenson (pre 1997)	2,160	2,579	2,498	2,596
	Swissedent (pre 1997)	59	70	68	70
	Myerson/Austen/Kenson/Swissedent (1997 on)	n/a	n/a	n/a	n/a
	AM Tooth/Justi/Dymon Hue/Regal	2,030	2,425	2,348	2,440
	Dentorium	822	982	951	988
	Vita/Vident	1,471	1,757	1,701	1,768
	Other	2,746	3,280	3,176	3,301
	Total	58,801	70,221	68,002	70,673

Notes: (1) Company groupings are based on information found in the Manufacturers section of the Appendix to United States' Response to Dentsply's First Interrogatory.

Sales figures are calculated by multiplying market shares from Table D.1 by the Total Market Sales column from Table D.2A.

(2) Totals for each tooth segment do not sum to the total market due to rounding error and approximation.

Table D.3: US Teeth Market Sales (in \$000)

Segment	Company (1)	1996	1997	1998	1999
Porcelain	Dentsply	4,623	4,409	4,367	4,018
	Ivoclar	-	-	-	-
	Universal	203	194	192	177
	Myerson/Austenal/Kenson (pre 1997)	203	n/a	n/a	n/a
	Swissedent (pre 1997)	51	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	242	240	221
	AM Tooth/Justi	-	-	-	-
	Dentorium	-	-	-	-
	Vita/Vident	-	-	-	-
	Other	-	-	-	-
	Total	5,080	4,845	4,799	4,415
Premium	Dentsply	38,366	41,684	45,566	40,047
	Ivoclar	1,293	1,405	1,536	1,350
	Universal	862	937	1,024	900
	Myerson/Austenal/Kenson (pre 1997)	862	n/a	n/a	n/a
	Swissedent (pre 1997)	-	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	937	1,024	900
	AM Tooth/Justi	-	-	-	-
	Dentorium	-	-	-	-
	Vita/Vident	1,724	1,873	2,048	1,800
	Other	-	-	-	-
	Total	43,108	46,836	51,197	44,997
Medium	Dentsply	3,824	3,389	3,056	3,174
	Ivoclar	235	209	188	195
	Universal	294	261	235	244
	Myerson/Austenal/Kenson (pre 1997)	177	n/a	n/a	n/a
	Swissedent (pre 1997)	-	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	156	141	147
	AM Tooth/Justi	1,294	1,147	1,034	1,074
	Dentorium	-	-	-	-
	Vita/Vident	-	-	-	-
	Other	59	52	47	49
	Total	5,884	5,214	4,701	4,884
Economy	Dentsply	8,094	8,454	8,592	7,830
	Ivoclar	-	-	-	-
	Universal	-	-	-	-
	Myerson/Austenal/Kenson (pre 1997)	1,401	n/a	n/a	n/a
	Swissedent (pre 1997)	-	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	1,463	1,487	1,355
	AM Tooth/Justi/Dymon Hue/Regal	1,401	1,463	1,487	1,355
	Dentorium	1,090	1,138	1,157	1,054
	Vita/Vident	-	-	-	-
	Other	3,580	3,739	3,800	3,463
	Total	15,565	16,258	16,522	15,059
Total (2)	Dentsply	54,908	57,936	61,580	55,070
	Ivoclar	1,494	1,577	1,676	1,499
	Universal	1,390	1,467	1,559	1,394
	Myerson/Austenal/Kenson (pre 1997)	2,521	n/a	n/a	n/a
	Swissedent (pre 1997)	68	n/a	n/a	n/a
	Myerson/Austenal/Kenson/Swissedent (1997 on)	n/a	2,732	2,904	2,597
	AM Tooth/Justi/Dymon Hue/Regal	2,370	2,501	2,658	2,377
	Dentorium	960	1,013	1,077	963
	Vita/Vident	1,717	1,812	1,926	1,722
	Other	3,206	3,382	3,595	3,215
	Total	68,634	72,419	76,974	68,836

Notes: (1) Company groupings are based on information found in the Manufacturers section of the Appendix to United States' Response to Dentsply's First Interrogatory.

Sales figures are calculated by multiplying market shares from Table D.1 by the Total Market Sales column from Table D.2A.

(2) Totals for each tooth segment do not sum to the total market due to rounding error and approximation.

EXHIBIT E

Attachment E: Dentsply Anticompetitive Conduct

Adium Dental Products

- Had to agree to carry only Dentsply teeth when became a Dentsply dealer (DOJ Appendix, p.1). If not for this policy, Adium would like to sell Kenson teeth and would have taken Austenal's Kenson consignment offer (DOJ Appendix, pp.1-2). Instead, Adium's largest account goes elsewhere for Kenson teeth (DOJ Appendix, p.4).

Atlanta Dental Supply

- Attempted to take on Vita tooth line in 1993 but Dentsply threatened to pull all of its products if it added a competitive line of teeth (DOJ Appendix, p.7). Also see Harris deposition transcript, September 12, 1996, pp. 30-37. "Losing the Dentsply line would have had significant repercussions for Atlanta Dental because Dentsply comprises 90% of Atlanta's tooth stock." Atlanta has not attempted to add another competitor since Vita. (DOJ Appendix, p.8.)

Benco Dental

- All Universal teeth taken out of Benco Dental when added Trubyte tooth volume. This program includes detailing with them to convert their Universal accounts. (Inter-Office Correspondence from E. Jilek to D. Pohl, 5/27/93, DS-025094.)

Darby Group

- In 1989, Dentsply demanded that subsidiary, City Dental in Manhattan, drop its generic Nordent line or have its Dentsply line "cut off." City Dental's Dentsply Dealership status was terminated when it refused Dentsply's demand. Darby filed law suit in response and ultimately parties signed a settlement agreement in January of 1991. (DOJ Appendix, p.12.) See also Nordhauser deposition transcript, August 29, 1996, pp. 21-24 and December 14, 1999, pp. 87-88.

Davis Dental Supply (DDS)

- Dentsply informed DDS in Phoenix that they could only become a distributor if they dropped Universal's teeth. Stayed with Universal for 7 or 8 more months and then decided to go with Dentsply because Universal/Lactona had filed for bankruptcy but Dentsply was no longer interested. (DOJ Appendix, p.16.)

Dental Laboratory Discount Supply

- Attempted to carry other tooth lines, but has ultimately been prevented from doing so by Dentsply threatening to terminate their dealership status (for both tooth and other Trubyte merchandise lines). (Brennan, October 28, 1999, pp.192-7).
- DLDS was notified of its "... discontinuation as a dealer as a result of adding Universal teeth to their product line. Upon notification of discontinuation, DLDS reversed their position regarding Universal. Therefore, we will be continuing to recognize DLDS as a dealer at this time." (Inter-Office Correspondence from D. Pohl to J.P. Clark, 5/3/94, DS 021040.)

Attachment E: Dentsply Anticompetitive Conduct

Dental Technician Supply(DTS)

- DTS sold Ivoclar teeth at one time but dropped them after Dentsply threatened to pull all its products from DTS (DOJ Appendix, p.88).

Frink Dental

- Sold Ivoclar teeth alongside Dentsply for a period but backed out in 1988 when Dentsply cut off all Trubyte division product sales (teeth and merchandise). (DOJ Appendix, pp.25, 87-88) Terminated "Because he took on Ivoclar teeth." (Brennan deposition transcript, 10/28/99, p.69). Both Trubyte teeth and merchandise were discontinued (ibid, p.86). Frink got the Dentsply line back "When they got rid of the Ivoclar teeth." (ibid, p.88) Brennan also added that "..., we would not have given it back unless he stopped selling Ivoclar." (ibid p.93).

Guggenheim

- Used to also carry Universal until 1991 when Dentsply offered deal to Guggenheim to give them \$100,000 in Dentsply inventory in exchange for swapping out their \$50,000 inventory of Universal teeth and no longer selling Universal (DOJ, p.108).

Jan Dental

- Now sells only Universal and Dentsply teeth. Prior to when it began selling Dentsply teeth in the early 1990's it used to sell Vita, Dentorium, American, Kenson-Myerson, and Universal. Dentsply required it let go of all other brands except Universal. (DOJ Appendix, pp. 59-60.)

H. Meer Dental

- Did at one time have deal to sell Vita teeth but in fear of Dentsply backed out at last minute and returned Vita tooth stock (DOJ Appendix, p115).

Ott Dental Supply (ODS)

- Sold Universal, Myerson, Justi, and added Vident in 1993. In December 1994 bought Feldman Dental Supply which was a Dentsply dealer and came with Dentsply tooth stock. Dentsply then told ODS they would not be honored as a Dentsply dealer unless they stopped selling Vident and returned their Vident tooth stock. (DOJ Appendix, p40-41.)

Pearson Dental

- Had agreed to sell Vita teeth, and placed in its product catalog, but backed out when threatened with the loss of dealership status by Dentsply (DOJ Appendix, p115). Also, told American and Austenal were not able to add their teeth because of Dentsply (DOJ Appendix, pp66 and 76, respectively).

Trinity Dental

- Terminated April 1993 due to decision to add a competitive tooth line (DS 042061 titled "Interrogatory #12). Did not distribute Dentsply teeth, only

Attachment E: Dentsply Anticompetitive Conduct

merchandise and then added a competitive tooth line at the end of 1992.
(Brennan, 10/28/99, pp 172-174.)